2001

NSERC
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NSERC

Visiting Fellowships in Canadian Government Laboratories

2001 - 2002

Investing in people, discovery and innovation
Investir dans les gens, la découverte et l'innovation

Natural Sciences and Engineering Research Council of Canada
Conseil de recherches en sciences naturelles et en génie du Canada
Canada

NSERC

Visiting Fellowships in Canadian Government Laboratories

2001 - 2002

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Visiting Fellowships in Canadian Government Laboratories 2001

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NSERC CRSNG **Program Guide**

Introduction

The Visiting Fellowships in Canadian Government Laboratories program provides promising young scientists and engineers with the opportunity to work with research groups or leaders in Canadian government laboratories and research institutions.

The number of awards varies according to the budgets of participating departments and agencies.

Application Procedures

To apply, submit Form 200, Application for an NSERC Scholarship or Fellowship.

There are no deadlines for application to this program; applications are processed and reviewed as they are received. If you are registered in a doctoral program, you should apply within six months of the date you expect to complete your program. You may apply only once in a one-year period.

Eligibility

You must have received a doctoral degree in the natural sciences or engineering from a recognized university within the past five years. Your application will be accepted if you are currently enrolled in a doctoral program at a recognized university; however, you must expect to complete all requirements for your degree (including the thesis defence) within six months of submitting your application. You will not be allowed to take up your award until confirmation of completion of degree requirements is received. You may hold only one Visiting Fellowship.

There are no restrictions on the nationality of applicants, but awards are subject to a citizenship quota: two-thirds of awards must be made to Canadian citizens or permanent residents. The Department of National Defence can consider applications from Canadian citizens only. Successful candidates who are not Canadians or permanent residents of Canada must satisfy Canadian immigration requirements.

Review Procedures and Selection Criteria

Selection committees, appointed by the individual government departments, will be responsible for the preselection of applicants, recommending only the most meritorious applicants whose names will be placed on the inventory of approved candidates for a Visiting Fellowship in Canadian Government Laboratories. Applicants will be informed by NSERC whether their names have been placed on the inventory two to three months after receipt of the application. **(Note: Candidates should be aware that placement on the inventory does not guarantee a fellowship; it is a preliminary requirement only.)**

Approved candidates to be offered a fellowship will be selected by the individual government departments. Successful applicants will be notified by NSERC or by the interested government department. The names of the approved candidates will remain on the inventory for one full year or until they are offered a fellowship.

The selection committee will rate the applications according to the following criteria:

- academic excellence
  - scholarships and awards held;
  - duration of previous studies;
- research ability or potential
  - quality of contributions to research and development;
  - relevant work experience and academic training;
  - critical ability; capacity for critical thought and analysis;
  - ability to apply skills and knowledge;
  - judgement, originality, and curiosity;
  - initiative and autonomy;
  - enthusiasm for research;
  - determination and ability to complete projects within an appropriate period of time;
- communication skills

    - ability or potential to communicate scientific concepts clearly and logically in written and oral formats (e.g., quality of presentation of application, participation in the preparation of publications, special awards for oral presentations or papers);
- interpersonal and leadership abilities
    - professional and relevant extracurricular interactions and collaborations (e.g., mentoring, teaching, supervisory experience, project management, chairing committees, organizing conferences/meetings, and elected positions held);
- justification for location of tenure
- potential benefits to the government department.

Stipend

The fellowship has an annual value of $37,520 plus a travel allowance for the fellow, as well as for his or her spouse and children. The stipend and travel allowance are subject to Canadian income tax.

Tenure

Appointments are made for one year; renewals for a second year or third year are possible, at the discretion of the government department concerned. A mutually agreeable start date should be negotiated with the government department.

Travel

Fellows will be reimbursed the cost of travel between the place of residence at the time the award is made and the laboratory at which the award is to be held. Married fellows accompanied by their spouse (and dependent children) will be eligible to receive an additional travel indemnity. The maximum amount payable is the cost of economy class air fare, via the most direct route, calculated from the rates in effect at the time of travel.

Similar allowances will be provided for the return journey upon termination of the fellowship.

If the fellow accepts employment on termination of the fellowship, the allowance will be equivalent to the fare required to get the fellow to the place of employment provided that the fare does not exceed the cost to return the fellow to the location where he or she resided when the fellowship was awarded.

A fellow who marries during tenure of the fellowship may be eligible to receive a return travel allowance for his or her spouse, provided that the marriage occurred at least 30 days before termination of the award.

Insurance

Since the Government of Canada cannot assume any obligation in the event of accidents, many government departments and agencies require that a life insurance policy be held by fellows for their own protection and that of their accompanying dependants. When an offer is made to a fellow to work in one of those departments or agencies, confirmation that fellows hold appropriate life insurance must be submitted to NSERC in one of the two official languages before an award can be started. Fellows must register for provincial health insurance coverage.

General Information for Fellows

Applicants who are offered fellowships will be sent a booklet that provides detailed information about the regulations governing their awards as well as procedures for payment of stipends. See Guide for Visiting Fellows in Canadian Government Laboratories 2001-2002.

Questions relating to the application procedures should be directed to:

Visiting Fellowships in Canadian
Government Laboratories
Scholarships and Fellowships Division
NSERC
350 Albert Street
Ottawa, Ontario
K1A 1H5

The *Access to Information Act* and the *Privacy Act* (ATIP)

The *Access to Information Act* (ATI) gives Canadian citizens and people present in Canada a limited right of access to information in federal government records. The *Privacy Act* gives these same individuals a limited right of access to personal information about themselves held in government records and sets out rules and fair practices for the management of personal information by federal institutions. All information collected by NSERC is subject to these laws.

You do not have to use the *Privacy Act* to obtain feedback on your NSERC application or to access personal information about you held in NSERC files. Simply write informally in the first instance to the appropriate program. And please remember that under the terms of the *Privacy Act*, the written opinion of a reviewer about your application is available to you, but the name of the reviewer is not.

All personal information collected by NSERC about grant, scholarship and fellowship applicants is used to peer review applications, to administer and monitor awards, and to promote and support research in science and engineering in Canada. A comprehensive statement of the specific uses and disclosures of personal information by NSERC is available in the NSERC *Program Guide for Students and Fellows*, the publication *Info Source* (a register of federal information holdings available in most large libraries) or from NSERC's ATIP Co-ordinator on request. These are the main ones:

As part of the peer review process, applications are disclosed to selection committees composed of experts recruited from the academic, private and public sectors. Certain applications may also be transmitted to external referees. Individuals recruited by NSERC to participate in these review activities are instructed to protect and treat as confidential all information entrusted to them by NSERC. For programs such as the Visiting Fellowships program, which NSERC administers on behalf of other federal departments, applications will be shared with appropriate officials in other federal institutions.

NSERC routinely publishes and disseminates certain details about successful applications. These include the name of the applicant(s), award type, amount awarded, institution and department (for scholarship and fellowship holders, the proposed location of tenure), the discipline or field of research, the project title and, for grant programs, a summary of the research proposal prepared by the applicant for public reference. For scholarship and fellowship programs, these details will be made publicly available immediately after the competition, even though some awards will be subsequently declined or deferred. NSERC may also publish on its Web site the names and relevant information of award recipients.

Information submitted to NSERC is subject to the Tri-Council Policy on Integrity in Research and Scholarship and may be used and disclosed consistent with that policy. (For the complete text of the policy, see the NSERC *Program Guide for Students and Fellows*.)

NSERC uses the information in its files and databases to generate mailing lists in order to disseminate its publications and other information to the research community. More information about the ATIP Acts can be obtained by writing to NSERC's Access to Information and Privacy Co-ordinator or from *Info Source*.

NSERC CRSNG

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Scholarships & Fellowships Programs

How to Complete the Web Version of Form 200

Read and/or print the following documents before you start completing Form 200:

- Frequently Asked Questions on how to use the On-line System;
- The *Program Guide for Students and Fellows* for deadline and program details.

Whom should I contact if I need help?

If you have questions regarding:

1. the **program** to which you are applying (e.g., content of the application, program deadlines, eligibility, etc.), contact the **Staff** responsible for the program;

2. the **On-line System**, send an e-mail to webapp@nserc.ca or call (613) 995-4273.

Please include in your message the e-mail address where you may be contacted as well as your telephone number.

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1. Before you begin
2. General instructions for all applicants
3. Cover Page
4. Completing Part I of your form
5. Completing Part II of your form
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7. Nomination for a NATO Science Fellowship
8. How to submit your application

Before you begin

Note that you can only complete **Part I** of your form using the electronic application process. You will find instructions and tips directly on the Web screens. **Part II** is "free form." Use your word processor to complete it, then print it on regular white paper. Provide the requested information according to the guidelines and format outlined in the General instructions for all applicants below.

Also, use this form in conjunction with the *Program Guide for Students and Fellows*.

General instructions for all applicants

Use this form if you are applying for the following types of support:

- Postgraduate Scholarships – PGS A and PGS B;
- Industrial Postgraduate Scholarships – IPS 1 and IPS 2;
- Postdoctoral Fellowships (PDF);
- Industrial Research Fellowships (IRF);
- Visiting Fellowships in Canadian Government Laboratories (VF); and
- NATO Science Fellowships.

Also...

- Use this form in conjunction with the NSERC *Program Guide for Students and Fellows*, the *Visiting Fellowships in Canadian Government Laboratories* guide, and the most recent description of the NATO Science Fellowships program. Before you complete the form, see the relevant guide for information about eligibility criteria, selection criteria, and application deadlines.
- If you are applying for more than one type of support, complete a separate application for each.
- If you would like to apply for an Undergraduate Student Research Award, use Form 202.

This application form has three parts:

Cover Page

In this part of the form (page included), you must provide your personal data.

Part I

In this part of the form (pages included), you must provide details about:

- academic background;
- academic, research, and work experience;
- the type of award you are applying for;

- proposed location of tenure; and
- your thesis(es).

Part II

This part of the application is "free form" and should be printed on regular white paper. Provide the requested information according to the guidelines and format outlined in the section General Presentation. Depending on the type of award you are applying for, you must provide information in some of the following categories:

- outline of proposed research;
- justification for location of tenure;
- scholarships, fellowships, and other awards received;
- contributions to research and development;
- most significant contributions to research and development; and
- applicant's statement.

Note

To be considered complete, your application must include the **Cover Page, Part I, Part II** and any additional documents as stated in the instructions. **NSERC may reject your application if it is not complete**.

General Presentation

When you prepare your application and supporting materials, follow these guidelines:

- Print must be in black ink, and be of letter quality (minimum standard).
- Text must be single-spaced, with no more than six lines per inch.
- If you use a type size measured in points (pts), it must be **no smaller** than 12 pts.
- If you use a type size measured in characters per inch (cpi), it must be **no more** than 10 cpi.
- Condensed type is **not** acceptable.

For Part II (which is free form):

- Use white paper 8 1/2 x 11 inches (21.5 cm x 28 cm).
- Set margins at 3/4 of an inch (1.7 cm) (minimum) all around.
- Enter your name and PIN (see instructions for cover page) at the top of every page.
- Print on one side of the paper only.
- The maximum number of pages allowed is indicated in the appropriate section. Pages in excess of the number permitted will be removed.

If you have supporting documents written in a language other than English or French, you are required to provide NSERC with a certified translation of the document.

Note
If your application does not meet these standards, NSERC may reject it.

Cover Page

Change of name

Have you changed your name since you last applied for support from NSERC? If you have, please list your previous name in parentheses in the appropriate area on Form 200.

Personal identification number (PIN)

All NSERC applicants have been, or will be, given a PIN. Once you have your PIN, use it each time you apply for an award and in future correspondence with NSERC. **If you have not previously applied to NSERC**, or if you cannot remember your PIN, leave that space on the form blank.

Note
The number generated by the on-line application process is **not** your PIN.

What does my signature on the application mean?

- You agree to abide by NSERC regulations governing awards;
- You understand the *Access to Information Act* and the *Privacy Act* as they pertain to application information;
- You have read and agree to comply with the Tri-Council Policy Statement: *Integrity in Research and Scholarship*;
- You agree to abide by regulations regarding animal care, ethical considerations in the use of human subjects in research, and biohazards;
- You will acknowledge, wherever possible, NSERC's funding assistance for the research; and
- You certify that the information provided in the application is complete and accurate to the best of your knowledge. The provision of false or inaccurate information may result in sanctions, including termination of funding and disentitlement from eligibility for future funding.

In addition, if you are a current or former (in the last twelve months) public-office holder or public servant in the federal government, you also certify that you:

- respect and comply with the *Conflict of Interest and Post-Employment Code for Public Office Holders* and the *Conflict of Interest and Post-Employment Code for the Public Service*.

Completing Part I of your form

Please consult Tips for preparing a successful PGS or PDF application.

Page 1

Academic background

Include only current and past programs. Do not include programs that you have **not** yet started.

Academic, research and other relevant work experience

In the area labelled "Position held and nature of work," specify whether the employment was full- or part-time. Also, indicate if you gained the experience in the course of a program of study.

Page 2

Code Tables

Consult the *List of Research Subject Codes for Scholarships and Fellowships*.

VF applicants

Choose the code that best describes your area of expertise.

Proposed location(s) of tenure

PGS/PDF applicants

Specify a maximum of three proposed locations of tenure.

IRF nominees

If you would like to be considered by more than one company, you must submit a separate application for each one.

VF applicants

Specify a maximum of three government departments or agencies. You should identify a proposed supervisor only if you have made contact with that person.

Page 3

Theses completed or in progress

For completed degrees, indicate the date by which you completed all degree requirements (not the convocation date). This includes your thesis defence, corrections, and deposition of thesis.

PGS A applicants

You may use this page to summarize an honours thesis, or a graduate thesis in progress. Students who do not have an honours thesis may describe a research project or a research-related work experience, indicating the nature of the work performed.

Completing Part II of your form

Part II – Free-form pages

Depending on the type of support you are seeking, you must provide information in some of the six sections listed below. Read the sections to see which ones apply to you.

Follow the General Presentation guidelines. Start numbering your pages continuing from the last page of Part I.

- For sections 1and 2, use one (1) page only for each section.
- For sections 3, 4, 5, and 6, the **maximum** number of pages you are permitted to use is as follows (this is the **total** number of pages for all four sections, not for each section):
  - **PGS A** – two (2) pages;
  - **IPS** and **PGS B** – three (3) pages; and
  - **IRF, PDF, NATO** and **VF** – five (5) pages.

Additional pages will be removed.

Provide the required information using the specified headings and follow the order that has already been established. Some sections will require program-specific information.

Section 1
Outline of proposed research (one page)

Applicants must complete this section themselves.

Be as specific as possible when describing proposed research. For information about the eligible fields of research, see the NSERC *Program Guide for Students and Fellows*. In addition, remember to do the following:

- Write in plain language. Your outline should be readable by someone with a background in the discipline but with no specialized knowledge of the particular field of research. You should not repeat the information found in Part I, page 3.
- Provide a detailed description of your proposed research activities for the period during which you are to hold the award. State the objectives and outline the experimental or theoretical approach to be taken, and the methods and procedures to be used. State the significance of the proposed research activities to the field.
- If the proposed research is a continuation of your thesis, clearly state the differences between work done for your thesis and the research activities outlined in this proposal.

Also...

- **PGS A applicants**

  If you have not yet formulated a plan of research, you must describe the specific research problems that interest you and explain why.

- **IRF nominees and VF applicants**

  You do not have to submit an outline of the proposed research.

- **IPS applicants**

  You should describe details of the planned interaction with the sponsoring company.

Section 2
Justification for location of tenure (one page)

Provide a rationale for your choice(s) for location of tenure. See the following sections for more program-specific information.

- **IPS and IRF nominees, or PGS A applicants remaining in Canada**

  You do not have to provide this justification.

- **PDF applicants**

  - All PDF applicants must complete this section;
  - If you have received a letter indicating that you have been accepted at the proposed location(s) of tenure, attach a copy to your justification;
  - If you would like to hold a PDF at the university from which you received or expect to receive your doctoral degree, you must:
    - provide an explanation of the reasons it is essential for you to hold the award at that particular university; and
    - submit supporting letters from the head of the department and the proposed supervisor.

- **PGS B applicants**

  All PGS B applicants must complete this section.

- **PGS A and B applicants requesting tenure abroad**

  If you are proposing location(s) of tenure outside Canada, you must justify your request to study abroad and explain your rationale for the choice of the particular research topic and university. You must also submit:

- a letter from a Canadian authority in the proposed field of research explaining whether:
  - the need to pursue graduate studies abroad due to the unavailability of a suitable program of research or the required facilities at a Canadian university (the availability of the program should be discussed, not simply whether or not the specific thesis project can be carried out in Canada); and
  - the benefits to the applicant of studying abroad (e.g., unique opportunity to train in a world-class laboratory).

- **VF applicants**

  You should address the suitability of your educational qualifications and research experience as they relate to the mandate and research interests of the government laboratory (or laboratories) proposed as location(s) of tenure. If you have received a letter indicating interest in your candidacy from the proposed location(s) of tenure, you should attach a copy to the application.

- **NATO applicants**

  All NATO applicants must complete this section.

Section 3
Scholarships, fellowships, and other awards received

Starting with your most recent (and including NSERC awards), give the name of the award, the value, the type (institutional, provincial, national, or international), the location of tenure, and the period held. Present the information in a table format.

Only list the support awarded on the basis of academic and research excellence and/or in recognition of your leadership or communication abilities.

Section 4
Contributions to research and development

List your contributions to research and development. Begin with your most recent, and list each entry on a new line. Do not include any articles that are currently in preparation. Use the following headings and order in your listing:

a. Articles published or accepted in refereed journals;

b. Articles submitted to refereed journals;

c. Other refereed contributions (e.g., communications, papers in refereed conference

proceedings, posters, etc.);

d. Non-refereed contributions (e.g., specialized publications, technical reports, conference presentations, posters, etc.);

e. Technology transfer;

f. Contributions resulting from your participation in industrially relevant R&D activities; and

g. Patents and copyrights (e.g., software, but excluding publications).

Note
Many contributions to industry or other end-users take the form of technical or internal reports, some of which may be confidential to protect proprietary information, or may be subject to patent or copyright protection. If your record includes contributions of this kind, a letter from a university or company researcher involved with technology transfer should accompany your application, and this letter should attest to the nature and significance of the contribution in as specific terms as possible.

For published contributions, list the following: the full authorship as it appears in the original publication; the year, title, name, and volume of the publication; and the first and last page numbers.

Example

Li, H., George, A.F., and Kay, M. (1994) Protein-structure interactions in cell membranes. Journal of Biological Chemistry. 269: 1120-1124 (Ph.D. work).

For publications submitted or in press, indicate the date of acceptance/submission and the number of pages submitted.

For patents, include the title and names of joint inventors.

In all cases, indicate whether the publication resulted from work done in the process of completing your undergraduate, master's, or doctoral degree, or from other relevant work experience.

Updates to your publication record will not be accepted after the application deadline date.

Also...

- **IRF nominees**

  You should discuss the reasons for selecting certain journals for publication and the particular features of the journals (e.g., target audiences, review procedures). Provide details, as appropriate, on the significance of technical reports and original research reported in books or technical reports.

Section 5
Most significant contributions to research and development

From the contributions listed in section 4, choose up to three that you judge to be your most significant contributions to research and development. Comment on the importance of these contributions to the research area. For each contribution, provide a brief description of your role in the research. Clarify your contribution to the actual writing of joint publications.

As appropriate, indicate any collaboration with other researchers, and discuss the relevance of your work to engineering practice or industrial processes.

Section 6
Applicant's statement

In this section, group your comments under the following headings:

a. **Research experience**

Describe the scientific or engineering abilities that you have gained through your past research experience. If you have relevant work experience, discuss the relevance of that experience to your proposed field of study/research and any benefits you gained from it. Do not repeat any information you provided in section 5.

b. **Relevant activities**

Describe the activities (professional and relevant extracurricular) in which you are involved that demonstrate your communication, interpersonal, and leadership skills. Examples of these include: oral presentations, mentoring, teaching, project management, chairing committees, organizing conferences or meetings, supervisory experience, elected positions held and volunteer work.

c. **Research career**

Discuss your career goals. Explain why you believe that you are particularly suited for a career in research or related professions in the natural sciences or engineering.

Also...

- **IRF nominees**

Discuss the expectations you have of the nominating company (in terms of the support and guidance to be provided, and the skills and expertise to be gained). Explain how it will help you attain your goals.

d. **Special circumstances**

In this section, describe any special considerations that may have had an effect on your performance or productivity. Include any considerations that may have resulted in delays in disseminating your research results, such as health problems, family responsibilities, disabilities, or other circumstances (e.g., the time necessary to complete a monograph, file a patent, or commercialize an industrial process or product). Explain any gaps in the chronology of your experience. The selection committee will take these circumstances under consideration when evaluating your application.

Appendices

- Appendix 1
- Appendix 2

Completing Appendices 1 and 2

Appendix 1

Report on the Applicant

Each application (except IPS applications) submitted to NSERC must be accompanied by two original reviews (see Appendix 1).

The reports must be completed by persons capable of making an informed assessment.

- One report should be from a person very familiar with your work and abilities (e.g., current research supervisor or previous academic or industrial supervisor in the case of recent graduates).
- The second report should be from a person in a position to make an arm's length assessment, yet sufficiently familiar with your research and other abilities to provide a meaningful commentary and rating.

Note
If you were involved in a co-op work experience, the reviewer could be your industrial supervisor.

Enter your name and PIN, and the award for which you are applying in the space provided on the form. Indicate to whom this material should be returned and by which date.

What you should do

Provide a photocopy of your completed application to each of the reviewers. Provide the reviewers with the instructions and the original of Appendix 1.

Allow sufficient time to enable each reviewer to complete and return the report (see instructions for the appendix). Remember to include pre-addressed return envelopes.

If the reviewer returns the completed Appendix 1 directly to you in a sealed envelope, forward it unopened as indicated below:

- **IRF nominees** – to NSERC or the nominating company;
- **PDF, PGS and NATO applicants** – to the head of the university department who will be completing Appendix 2; and
- **VF applicants** – to NSERC.

Also...

- **IRF nominees**

You may submit additional reports. For more information, see the NSERC *Program Guide for Students and Fellows*.

Appendix 2

Departmental/University Evaluation

This evaluation form is for anyone applying for a PGS or PDF.

The evaluation must be completed by the department head, the head's representative, or a departmental committee of your current department, or former department if you are not currently attending university.

The same person **may not** complete Appendices 1 and 2. In addition, your proposed supervisor **must not** complete Appendix 2.

PDF applicants

Appendix 2 must be completed by the university that conferred or will confer your doctoral degree.

Appendix 3

Consent Form and Statistical Information

Part 1 – PGS, PDF and IPS applicants

If you wish to be considered for other types of scholarships, fellowships and supplements offered by Canadian government laboratories, industrial organizations and/or associations, as described in the NSERC *Program Guide for Students and Fellows*, you must complete and sign this form.

Part 2

In this part, you should provide, on a voluntary basis only, information on your gender, your language capability, and your designated group.

Appendix 1

Report on the Applicant (Application for an NSERC Scholarship or Fellowship – Form 200)

INSTRUCTIONS

Who should complete this form?

Complete this form if you have agreed to evaluate an applicant for an NSERC award.

Also...

- Use this form in conjunction with the applicant's completed copy of Form 200, *Application for an NSERC Scholarship or Fellowship*.
- Once you have completed this "Appendix 1, *Report on the Applicant*," NSERC and review committees (made up of external experts) will use it to review and assess the application for an award.
- Complete and submit this appendix by the date specified on the form. NSERC will not consider the application complete without it.

General Presentation

When you prepare your report on the applicant, follow these guidelines:

- Print must be in black ink, and be of letter quality (minimum standard).
- Text must be single-spaced, with **no more** than six lines per inch.
- If you use a type size measured in points (pts), it must be **no smaller** than 12 pts.
- If you use a type size measured in characters per inch (cpi), it must be **no more** than 10 cpi.
- Condensed type is **not** acceptable.

How to complete this appendix

If you are completing an evaluation:

- for a **PGS applicant**, use only the form provided; or
- for **all other applicants**, use one additional page if necessary.

Rate the applicant on each of the evaluation criteria listed below and provide a justification of your rating. Rather than providing general comments, assess the applicant's strengths and limitations for each criterion. Include **specific examples** of the applicant's accomplishments and contributions to support your assessment.

Note
If you provide exceptionally high or low ratings that are inconsistent with the application as a whole, they may diminish the report's credibility.

In accordance with the *Privacy Act*, this report will be accessible to the applicant.

Evaluation criteria

Research ability or potential

- Quality of the applicant's contributions to R&D, and role in joint publications.
- Quality of the journals in which the applicant has published.
- Relevance of applicant's work experience and academic training to the field of proposed research.
- Significance, feasibility, and merit of proposed research (not required for IRF and VF).
- Applicant's suitability for research (in the case of IRF nominees, you should specifically address the suitability for research in industry) in terms of:
    - ability for critical thought and analysis;
    - ability to apply skills and knowledge;
    - judgement;
    - originality;
    - initiative and autonomy;
    - enthusiasm for research; and
    - determination and ability to complete projects within an appropriate period of time.

Communication skills

- Ability or potential to communicate scientific concepts clearly and logically in written and oral formats (e.g., quality of presentations and papers, effectiveness of teaching).

Interpersonal and leadership abilities

- Ability or potential to interact effectively with co-workers in a scientific setting (e.g., capacity to share ideas, to provide and receive critical feedback).
- Leadership ability or potential relevant to a scientific career (e.g., mentoring, teaching, project management, chairing committees, organizing conferences or meetings, supervisory experience).

RELATIVE WEIGHTING OF CRITERIA

	PGS A	PGS B	PDF
Academic excellence	50	30	15
Research ability or potential	30	50	60
Oral and written communication	10	10	10
Interpersonal and leadership abilities	10	10	15

Submitting the appendix

Once you have completed your evaluation of the applicant, return Appendix 1 to the following person or organization:

For PGS and PDF applications

Mail it in a sealed envelope to the applicant. You can also submit it to the head of the department at the university where the applicant is currently registered, or from which the applicant obtained the last degree.

For IRF applications

Submit it to the nominating company or to NSERC.

For VF applications

Submit it directly to NSERC.

For NATO applications

Submit it to the nominating university and to NSERC.

Mailing address

If you are submitting this appendix directly to NSERC, mail it to the following address:

Scholarships and Fellowships Division
NSERC
350 Albert Street
Ottawa, Ontario K1A 1H5
Canada

Privacy issues

The information you are asked to provide is collected under the authority of the *Natural Sciences and Engineering Research Council Act*. Information on applications received by NSERC is stored in a series of NSERC data banks described in the federal publication *Info Source*. You can find details on how this information may be used in the *Access to Information Act* and the *Privacy Act*, in the NSERC *Program Guide for Students and Fellows*.

You must use the information provided by the applicant only to help you complete Appendix 1 of the form, *Report on the Applicant*, and not for any other purposes.

NSERC routinely gives applicants access to information about them on file, but does not provide the applicant with the name of the person who signed the evaluation or the names of any other applicants mentioned in a comparative context. However, due to the nature of the application process, applicants are usually aware of who has completed their evaluation. As a result, you cannot expect privacy or anonymity.

With the consent of the applicant (Appendix 3), NSERC may release the complete application, including appendices, to interested government laboratories or agencies participating in the Visiting Fellowships in Canadian Government Laboratories program, industrial organizations participating in the Industrial Research Fellowships program, and agencies providing supplements in the Postgraduate Scholarships program.

Appendix 2

Departmental/University Evaluation (Application for an NSERC Scholarship or Fellowship – Form 200)

INSTRUCTIONS

Who should complete this form?

Complete this form if you are evaluating an applicant for an NSERC award and you are the head of the department or a representative.

What do you need to complete this form?

Before you start completing this form to evaluate the applicant, make sure you have:

- Parts I and II of the applicant's completed copy of Form 200, *Application for an NSERC Scholarship or Fellowship*;
- completed copies of Appendix 1, *Report on the Applicant*, from two reviewers;
- the applicant's official academic transcripts; and
- other documents as described in Form 200, *Application for an NSERC Scholarship or Fellowship*.

Complete this evaluation for all PGS and PDF applicants regardless of their current status. This information contributes to a fair assessment and comparison of all applicants whether they are still attending university or have been away for a number of years. If you are unable to provide a useful evaluation due to the length of time since the applicant was last registered in your department, please indicate this on the form.

Notes:

- The same person cannot complete **both** Appendix 1, *Report on the Applicant*, and Appendix 2, *Departmental/University Evaluation.*
- The proposed supervisor must **not** complete Appendix 2, *Departmental/University Evaluation.*

General Presentation

When you prepare your departmental/university evaluation, follow these guidelines:

- Print must be in black ink, and be of letter quality (minimum standard).
- Text must be single-spaced, with **no more** than six lines per inch.
- If you use a type size measured in points (pts), it must be **no smaller** than 12 pts.
- If you use a type size measured in characters per inch (cpi), it must be **no more** than 10 cpi.
- Condensed type is **not** acceptable.

A. How to complete this evaluation

This application has three parts: **Part I**, **Part II**, and **Part III**. Complete the part that applies to you.

Part I – The applicant

The applicant should complete Part I of the form and indicate whether the application is being submitted through a Canadian university or directly to NSERC.

Part II – The head of the department or a representative

Description of peer group

In this part of the form, you must define the peer group to whom the applicant is being compared. The peer group used for comparison should be consistent for all applicants – for the same award and from the same department – and should be large enough to provide a meaningful ranking.

Note that the peer group for applicants who have been away from university for **more** than 12 months may differ from that used for applicants who are currently enrolled in university, or

who have been away from a Canadian university for **less** than 12 months.

Departmental ranking of applicant in comparison to peer group

In this part, indicate how the applicant ranks in comparison to other applicants in the same program of studies, or to peers at a similar level of experience.

Departmental comments on the applicant

Discuss the qualities or factors that led to the departmental ranking of the applicant. Comment on the applicant's strengths and limitations in comparison to the peer group using the following criteria:

- Academic excellence
- Research ability or potential
- Communication skills
- Interpersonal and leadership abilities

For more information about these selection criteria, consult the NSERC *Program Guide for Students and Fellows*.

RELATIVE WEIGHTING OF CRITERIA

	PGS A	PGS B	PDF
Academic excellence	50	30	15
Research ability or potential	30	50	60
Oral and written communication	10	10	10
Interpersonal and leadership abilities	10	10	15

Explain any discrepancies between the comments and rating in Appendix 1, *Report on the Applicant*, and the departmental ranking. If there were any unusual circumstances that may have affected the applicant's performance, please explain them.

If you are recommending an applicant for a PGS award who has not achieved a first-class average during the last two years of study, you must provide a rationale for the recommendation.

Ranked list of all PDF applicants from the department in the current competition

When there is more than one applicant, you must submit a ranked list of all PDF applicants from the department in the current NSERC competition. Applicants of equal merit may be grouped together.

NSERC recommends that the rankings and information requested in this section be based on a departmental committee's recommendations.

Part III – The scholarship liaison officer

This section is not to be completed for applicants applying directly to NSERC.

PGS only – weighted annual averages

On the form, indicate the weighted annual averages (grade point, percentage) for each of the last two completed years of study. Annotate the transcripts (do not highlight) to indicate which courses you have used in the calculation. You should note that, for PGS B candidates applying in their third year of graduate studies, the average calculated for the last year completed should be that of the two years at the master's level. The "second last year" in such cases is considered to be the last year of undergraduate studies.

University ranking of applicant

In this part, indicate how the applicant ranks in comparison with other applicants being recommended by the university in each category.

B. Submitting this evaluation

Once complete, the appendix and the application documentation should be returned to the following person or organization:

For PGS applications being submitted through a Canadian university

Submit it directly to the Canadian university office responsible for reviewing and recommending applicants who are required to apply through a Canadian university.

For PDF and direct PGS applications

Mail it directly to NSERC at:

Scholarships and Fellowships Division
NSERC
350 Albert Street
Ottawa, Ontario K1A 1H5
Canada

For more information about submitting an application, consult the NSERC *Program Guide for Students and Fellows*.

Privacy issues

The information you are asked to provide is collected under the authority of the *Natural Sciences and Engineering Research Council Act*. Information on applications received by NSERC is stored in a series of NSERC data banks described in the federal publication *Info Source*. You can find details on how this information may be used in the *Access to Information Act* and the *Privacy Act*, in the NSERC *Program Guide for Students and Fellows*.

You must use the information provided by the applicant only to help you complete Appendix 2 of the form, *Departmental/University Evaluation*, and not for any other purposes.

NSERC routinely gives applicants access to information about them on file, but does not provide the applicant with the name of the person who signed the evaluation or the names of any other applicants mentioned in a comparative context. However, due to the nature of the application process, applicants are usually aware of who has completed their evaluation. As a result, you cannot expect privacy or anonymity.

With the consent of the applicant (Appendix 3), NSERC may release the complete application, including appendices, to interested government laboratories or agencies participating in the Visiting Fellowships in Canadian Government Laboratories program, industrial organizations participating in the Industrial Research Fellowships program, and agencies providing supplements in the Postgraduate Scholarships program.

Nomination for a NATO Science Fellowship

INSTRUCTIONS

Who should complete this nomination?

Complete this nomination if you are the proposed supervisor and would like to nominate an individual for a NATO Science Fellowship.

Also...

- Before you complete this nomination, see the most recent description of the NATO Science Fellowship program for more information about eligibility criteria, selection criteria, and application deadlines.
- Prepare this nomination in conjunction with Form 200, *Application for an NSERC Scholarship or Fellowship*, which has been completed by the candidate you are nominating.
- Provide additional information on separate paper. For guidelines on how to submit free-form information, see General presentation below.

Who should prepare the nomination papers?

The proposed supervisor is responsible for preparing the nomination papers and forwarding them, along with Form 200 and any supporting documentation, to NSERC.

Assessing the nominee and the expected contribution

You should provide the following information:

- A detailed assessment of the nominee's potential as a researcher and of the proposed research activity. Take into account the nominee's academic strength and the reputation of the university at which the nominee completed studies. In your assessment, consider the current supervisor's comments, the nominee's published papers and other

contributions to research and development, and any other pertinent information available.

A discussion of the quality of the foreign journals in which the nominee has published would be helpful.

- A detailed rationale for the nomination. Possible points of discussion include the:
  - suitability of the nominee's research interests to those of the proposed supervisor;
  - availability of the necessary specialized equipment and field research facilities;
  - possibility of the visit leading to long-term collaboration with a foreign establishment; and
  - possibility of the nominee participating in collaborative research involving both the proposed supervisor and industrial researchers.

- A detailed discussion of the benefits that are likely to accrue to the fellow, to the university and to Canada. How will the fellow benefit from the fellowship? Will the department's research capacity be enhanced? Will new techniques be acquired from another country? Will new links be established with other countries that could benefit Canada? Is the research in an area of strategic importance to Canada? What are the prospects for the fellow's subsequent reintegration in his/her home country? Will this collaboration be likely to turn into an ongoing collaboration with the Partner country researcher(s)?

- Justification for the proposed length of tenure (six months, one year or two years) in terms of the anticipated achievements during the term of the fellowship, the nature of the the time required to establish a meaningful collaboration. It is anticipated that most fellowships will be awarded for 12 months; requests for tenure of six months or two years should therefore be strongly justified.

- A relative ranking of the candidates, if more than one candidate is being nominated by your department.

- Confirmation that the nominating university or host supervisor will provide the mandatory $5,000 contribution to the stipend (for Industrial Fellowships, see below).

For industrially-related fellowships:

In addition to the above information, nomination for industrially-related fellowships should contain the following:

- a commitment from the industrial partner to contribute $5.000 per year if a fellowship is awarded;
- general information about the sponsoring company to determine its eligibility;
- a description of the research facilities to which the fellow will have access, the name of the proposed supervisor at the company, and a detailed description of the proposed interaction, including details of the time to be spent at the company.

Please note that before the fellow can take up an industrially-related award, NSERC will require that an agreement be signed by the university, the fellow and the industrial partner

- confirming that an Intellectual Property Agreement is in place;
- declaring any conflicts of interest of the proposed supervisor and the nominee, and stating that they do not have personal financial involvement with the sponsoring company. The university must confirm that the participants will follow the conflict of interest guidelines of the university.

Note
References to attached documents are **not** acceptable. Unsolicited documents will not be forwarded to the selection committee.

What does a signature mean?

The signature certifies that, if the nomination is approved:

- the fellow will be provided with the opportunity to engage in research as described on Form 200;
- every reasonable effort will be made to ensure that the fellow's stay in Canada will be successful;
- the fellow's time will be devoted entirely to research activities, and no teaching duties will be required; and
- the university will notify NSERC if the fellow's performance is considered unsatisfactory.

General Presentation

When you prepare the application and supporting materials, follow these guidelines:

- Print must be in black ink, and be of letter quality (minimum standard).
- Text must be single-spaced, with no more than six lines per inch.
- If you use a type size measured in points (pts), it must be **no smaller** than 12 pts.
- If you use a type size measured in characters per inch (cpi), it must be **no more** than 10 cpi.
- Condensed type is not acceptable.
- Use white paper, 8 1/2 x 11 inches (21.5 cm x 28 cm).
- Set margins at 3/4 of an inch (1.7 cm) all around.
- You can use a maximum of two pages.
- At the top of page 1, list the nominee's last name, given name and initials, and the year of the award.

- At the bottom of page 2, include the signatures and printed titles of the supervisor (or representative), the head of the department, and the university president (or representative).

Note:
If your application does not meet these standards, NSERC may reject it.

Mailing address

Send nominations for a NATO Science Fellowship to:

Scholarships and Fellowships Division
NSERC
350 Albert Street
Ottawa, Ontario K1A 1H5
Canada

Privacy issues

The information you are asked to provide is collected under the authority of the *Natural Sciences and Engineering Research Council Act*. Information on applications received by NSERC is stored in a series of NSERC data banks described in the federal publication *Info Source*. You can find details on how this information may be used in the *Access to Information Act* and the *Privacy Act* (ATIP), in the *Program Guide for Professors* on NSERC's Web site.

How to submit your application

When you submit your application, make sure you include up to date, official academic transcripts and supporting documentation, including the appropriate appendices. If you are contacting former universities and institutions to obtain this documentation, please remember that it may take time for them to provide you with the information you need for your application. As a result, plan ahead. Make sure you allow enough time before the application deadline.

For each of the programs, use the appropriate checklist to make sure your application is complete.

PGS A and B

- Form 200 – Parts I and II
- Support letters for foreign locations of tenure
- All official academic transcripts (undergraduate and graduate)
- Appendix 1, *Report on the Applicant*, in a sealed envelope (two required)

IPS

- Form 200 – Parts I and II
- Official academic transcripts (undergraduate and graduate)
- Names of the faculty supervisor and the company co-supervisor
- Information on the sponsoring company

- Appendix 2, *Departmental/University Evaluation*
- Signed cover page
- Signed consent form (if applicable)

Number of copies: 1

Submit your application to the head of the department who will be completing Appendix 2.

PDF

- Form 200 – Parts I and II
- Support letters for location of tenure (if applicable)
- Official academic transcripts (graduate)
- Appendix 1, *Report on the Applicant*, in a sealed envelope (two required)
- Appendix 2, *Departmental/University Evaluation* from Ph.D. University
- Signed cover page
- Signed consent form (if applicable)

Number of copies: 1

Applicants are responsible for ensuring the application is complete.

Submit your complete application directly to NSERC.

VF

- Form 200 – Parts I and II
- Copy of Diploma (if Ph.D. not completed, letter from department head stating the expected date of completion)
- Appendix 1, *Report on the Applicant*, in a sealed envelope (two required)

Number of copies: 2

Submit your application directly to NSERC

- Description of the research facilities to which the student will have access
- Certification by the Dean of Graduate Studies of your admission to the proposed degree program
- Statement signed by the university, the company, the student, and the university supervisor

Number of copies: 1

Submit your application directly to the university's Graduate Studies Office.

IRF

- Form 200 – Parts I and II
- Official academic transcripts (graduate)
- Appendix 1, *Report on the Applicant*, in a sealed envelope (minimum of two required)
- Two copies of publications
- Letter from collaborating organization (if applicable)

Number of copies: 1

Submit the application to the industrial organization which will then forward it to NSERC along with Form 217.

NATO

- Form 200 – Parts I and II
- Copy of diploma
- Appendix 1, *Report on the Applicant*, in a sealed envelope (two required)
- Nomination for a NATO Science Fellowship

Number of copies: 1

Submit your application to the proposed supervisor who will complete the nomination for a

NATO Science Fellowship

Applications submitted directly to NSERC

If you are a **PGS** applicant and you are applying directly to NSERC, or if you are a **PDF** or **VF** applicant, you are responsible for making sure that the application documentation (including the required appendices) is completed and submitted to NSERC by the appropriate program deadline.

If you submit your application **directly** to NSERC, NSERC will acknowledge receipt of your application. However, applications submitted **indirectly** – through a university or industrial organization – will not be acknowledged to individual applicants.

Mailing address

Scholarships and Fellowships Division
NSERC
350 Albert Street
Ottawa, Ontario K1A 1H5
Canada

Natural Sciences and Engineering Research Council of Canada | Conseil de recherches en sciences naturelles et en génie du Canada

FORM 200
Application for an NSERC Scholarship or Fellowship
COVER PAGE

Date

Family name of applicant	Given name and initial(s)	Personal identification no. (PIN)

ADDRESSES

Current address	Permanent mailing address (if different than current address)
If current address is temporary, indicate leaving date	Telephone number at permanent mailing address

Telephone number	Facsimile number	E-mail address

CITIZENSHIP

☐ Canadian citizen

☐ Permanent resident of Canada — Indicate date of landing as per Form IMM 1000

☐ Other — Indicate country of citizenship

LANGUAGE OF CORRESPONDENCE

I wish to receive my correspondence in:

☐ English ☐ French

SIGNATURE

I hereby agree that any award made to me as a result of this application will be subject to the general conditions governing scholarships and fellowships. These conditions are outlined in this Web site in the NSERC *Program Guide for Students and Fellows*, the *Visiting Fellowships in Canadian Government Laboratories* guide, and the description of the NATO Science Fellowships program.

Applicant's signature

Canada

Personal information collected on this form and appendices will be stored in the Personal Information Bank for the appropriate program.

PROTECTED WHEN COMPLETED

Version française disponible

Natural Sciences and Engineering Research Council of Canada | Conseil de recherches en sciences naturelles et en génie du Canada

FORM 200
Application for an NSERC Scholarship or Fellowship
PART I

Date

Family name of applicant	Given name and initial(s)	Personal identification no. (PIN)

ACADEMIC BACKGROUND (include only current and past degree programs)

Degree	Name of discipline	Department, institution and country	Month and year started	Month and year awarded/expected
Bachelor's				
Master's				
Doctorate				

ACADEMIC, RESEARCH AND OTHER RELEVANT WORK EXPERIENCE

Position held and nature of work (begin with current)	Organization and department	Supervisor	Period (mm/yyyy - mm/yyyy)

Personal identification no. (PIN)	Family name, given name and initial(s) of applicant

AWARD APPLIED FOR

Type of award		Proposed starting date of award
Proposed degree program (Master's, Doctorate)	**Proposed field of study/research**	**Research subject code**

Title of proposed research (not required for VF applicants)

List ten (10) key words that describe your proposed research. Use commas to separate them. (Not required for VF applicants.)

PROPOSED LOCATION(S) OF TENURE (in order of preference)

Institution/organization	Department	Proposed supervisor

SECTION TO BE COMPLETED BY PGS APPLICANTS ONLY

Indicate the number of months of graduate studies (master's and doctoral) you will have completed as of December 31 of the year of application.

_____ months of full-time graduate studies _____ months of part-time graduate studies

Indicate if you are attending university at the time of application.

☐ Attending part time ☐ Attending full time ☐ Not attending

Are you applying for tenure of your award abroad?

☐ Yes ☐ No

Personal identification no. (PIN)	Family name, given name and initial(s) of applicant

THESES COMPLETED OR IN PROGRESS

1. Degree	Supervisor	Date degree requirements completed

Title of thesis

2. Degree	Supervisor	Date degree requirements completed

Title of thesis

SUMMARY OF THESIS MOST RECENTLY COMPLETED OR IN PROGRESS (honours project, master's or doctoral)

Use plain language. Do not reproduce abstract of thesis.

NSERC CRSNG **Program Guide**

Agriculture and Agri-Food Canada

Agriculture and Agri-Food Canada (AAFC), with top research scientists, professionals, marketers and many others, works to ensure the agriculture and agri-food sector has the best chance to thrive in both domestic and international markets. Its mandate is to provide information, research and technology, and policies and programs to achieve security of the food system, health of the environment and innovation for growth.

To promote growth in the sector, the Department strives to develop policies, programs and services that translate into safe, nutritious food at reasonable prices to consumers. Excellence is integral in the promotion of Canadian products and in strengthening the agri-food sector's contribution to Canada's economic and environmental objectives.

The agriculture and agri-food portfolio is composed of branches, such as research branches, as well as Crown corporations and agencies like the Canadian Grain Commission. More than 4000 employees and nearly 600 scientists work within the Department across the country.

Agriculture and Agri-Food Canada maintains an electronic information service that provides instant access to departmental on-line services and information on federal agri-food programs, trade, commodity prices, regulations, agri-science, and technology.

Contact AAFC on the Internet at: www.agr.ca. Voice and fax-back services are available by calling: 1-800-346-2222.

Research Branch

Agriculture and Agri-Food Canada's labs help the sector play an international role in innovation. With its 19 research centres, AAFC is able to conduct location-specific research that reflects industry strengths in each region of Canada and to carry out research of national significance that benefits all Canadians. Each of the branch's centres has a specialized research focus of national importance, reflecting the type of industry in the region. The centres operate as nodes in a sophisticated network of scientific expertise, in collaboration with universities, other research organizations, and private enterprises. This offers numerous opportunities for training and development to trainees, students, postdoctoral fellows, and research associates.

Research is aimed at improving the quality and safety of Canada's food production and processing, as well as developing food and non-food products and services that capture opportunities in a manner that ensures the quality and availability of our environmental resources for present and future generations. Research is carried out in the labs through scientific studies leading to new technologies including new plant varieties, better environmental practices, responsible animal management systems, new food products, and even new products such as nutraceuticals and personal health care products.

Eastern Region

Atlantic Cool Climate Crop Research Centre – St. John's

Fields of Research

Research for crop production on mineral and peat soils under cool climate conditions with emphasis on integrated pest management, vegetable and forage crop production, soil quality and drainage, and management of native small fruits.

Contact

Dr. J.E. Richards
Director
Tel.: (709) 772-7474
Fax: (709) 772-6064
E-mail: richardsj@em.agr.ca

Atlantic Cool Climate Crop

Research Centre – St. John's
P.O. Box 37
Mount Pearl, Newfoundland
A1N 2C1

Atlantic Food and Horticulture Research Centre

Fields of Research

Fruit breeding, crop production, and post-harvest physiological research on orchard and berry crops; associated research to develop integrated pest management strategies; food research on storage, processing, and product development of fruits and vegetables.

Contact

Dr. P.W. Johnson
Director
Tel.: (902) 679-5333
Fax: (902) 679-2311
E-mail: johnsonw@em.agr.ca

Atlantic Food and Horticulture
Research Centre
32 Main Street
Kentville, Nova Scotia
B4N 1J5

Crops and Livestock Research Centre

Fields of Research

Research in the genetic improvement, tissue culture, and management of livestock feed crops, cereals, and forages; manure management, plant pathology, and weed science; potato cultivar management and fertility; soil tillage and erosion control; integrated management of insect pests, weeds, and diseases of potatoes. In addition, the Centre develops technologies for sustainable food production from beef cattle, integrating land, forage, and animal resources.

Contact

Dr. Christiane Deslauriers
Director
Tel.: (902) 566-6800
Fax: (902) 566-6821
E-mail: deslauriersc@em.agr.ca

Crops and Livestock Research Centre
P.O. Box 1210
Charlottetown, Prince Edward Island
C1A 7M8

Potato Research Centre

Fields of Research

The Potato Research Centre develops new cultivars and technologies for the production, handling, and management of potatoes. The Centre also maintains a national repository of potato gene resources and conducts research on soil management and conservation.

Contact

Dr. Richard Butts
Director
Tel.: (506) 452-3260
Fax: (506) 452-3316
E-mail: butts@em.agr.ca

Potato Research Centre

P.O. Box 20280
Fredericton, New Brunswick
E3B 4Z7

Soils and Crops Research and Development Centre

Fields of Research

Research in crop production and natural resources (soil and water), specifically on breeding, management, weed control, ecology, pathology, physiology, biochemistry, and genetic engineering of forage and cereal crops, and in soil and water conservation, soil chemistry, physics, and microbiology.

Contact

Dr. Gilles Rouselle
Director
Tel.: (418) 657-7980
Fax: (418) 648-2402
E-mail: rouselleg@em.agr.ca

Soils and Crops Research and
Development Centre
2560 Hochelaga Blvd
Sainte-Foy, Quebec
G1V 2J3

Dairy and Swine Research and Development Centre

Fields of Research

Various aspects of the productivity and profitability of dairy cattle, swine, sheep, and beef cattle including studies on nutrition; on the mechanisms involved in digestion, reproduction, growth, and lactation; on animal behaviour, meat quality, and livestock management; on manure management and soil conservation; on the use of forage crops by ruminants; and on forage production and conservation for northern areas.

Contact

Dr. Jaques Surprenant
Director
Tel.: (819) 565-9174
Fax: (819) 564-5507
E-mail: surprenantj@em.agr.ca

Dairy and Swine Research and
Development Centre
P.O. Box 90
2000 Route 108 East
Lennoxville, Quebec
J1M 1Z3

Horticultural Research and Development Centre

Fields of Research

The Horticultural Research and Development Centre at Saint-Jean-sur-Richelieu is specialized in field vegetable crops. At a regional level, the Centre is also involved in specific research in a few other crops.

The Centre conducts research in production, protection and conservation of horticultural commodities, for example, through precision farming in integrated production, options to substitute pesticides and modern post-harvest technologies.

Contact

Dr. Denis Demars
Director
Tel.: (450) 346-4494
Fax: (450) 346-7740

E-mail: demarsd@em.agr.ca

Horticultural Research and
Development Centre
430 Gouin Boulevard
Saint-Jean-sur-Richelieu, Quebec
J3B 3E6

Food Research and Development Centre

Fields of Research

Research is being conducted on milk, meat, and plant products as well as on bio-ingredients, food biotechnological processes, and food conservation. Various studies aimed at maximizing the use of foodstuffs with a view to improving food processing, enhancing our understanding of components, and upgrading by-products are undertaken.

Contact

Mme Angèle St-Yves
Director
Tel.: (450) 773-1105
Fax: (450) 773-2888
E-mail: styvesa@em.agr.ca

Food Research and Development Centre
3600 Casavant Blvd West
Saint-Hyacinthe, Quebec
J2S 8E3

Eastern Cereal and Oilseed Research Centre (ECORC)

Fields of Research

The mandate is to develop improved cereal and oilseed crop varieties required by the agri-food industry in eastern Canada, and to develop new knowledge and technology in biological and land resources.

Research is conducted to develop genetically improved, pest-resistant varieties of corn, soybeans, wheat, barley, and oats; to develop sustainable integrated agronomic systems; to diagnose and provide biosystematic information on insects, acari, fungi, and weeds, and on crop germplasm; to identify diagnostic methodologies for organisms that threaten crop and food quality and safety; to assess environmental sustainability and land resource quality; to evaluate and interpret land use capabilities; and to integrate land resource data.

Contact

Dr. Jean-Marc Deschênes
Director
Tel.: (613) 759-1816
Fax: (613) 759-1970
E-mail: deschenesjm@em.agr.ca

Eastern Cereal and Oilseed Research Centre
K.W. Neatby Building
Central Experimental Farm
Ottawa, Ontario
K1A 0C6

Southern Crop Protection and Food Research Centre

Fields of Research

Centre for development of alternative, environmentally friendly technologies for the protection of tree fruit, vegetable, and field crops; develops integrated pest management and biological methods of control of insects, diseases, and nematodes; conducts studies on ecology and modelling of pest populations, insect neurochemistry, host-pest interactions, and pesticide distributions and degradation; develops alternative crops (e.g., ginseng) and sustainable management practices for coarse-textured soils; determines impact

of agricultural practices on soil biosystem and soil and water quality.

Contact

Dr. Gilles Saindon
Director
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Southern Crop Protection and
Food Research Centre
1391 Sandford Street
London, Ontario
N5V 4T3

Greenhouse and Processing Crops Research Centre

Fields of Research

Develops and transfers new technologies for production of greenhouse vegetables (tomatoes, cucumbers, and peppers), field-grown processing vegetables, soybeans, and white beans. Research on management, quality, and characterization of Ontario soils is an important activity at the Centre. The Canadian Clonal Genebank, also located at Harrow, preserves the genetic diversity of Canadian fruit crops. The Centre has expertise in plant breeding, crop physiology and management, entomology, plant pathology, weed science, and soil science.

Contact

Dr. G.H. Whitfield
Director
Tel.: (519) 738-2251
Fax: (519) 738-3756
E-mail: whitfieldg@em.agr.ca

Greenhouse and Processing Crops
Research Centre
Highway 18 East
Harrow, Ontario
N0R 1G0

Food Research Program

Fields of Research

Carries out research and technology transfer to improve food quality, reduce processing costs, add value to agricultural raw materials for food and non-food uses, and support a healthy diet for Canadians. The main research emphases are nutraceuticals and functional foods; molecular and cellular biology; food preservation technologies; and structure and function of food and food components.

Contact

Mr. Greg Poushinsky
Director
Tel.: (519) 829-2400
Fax: (519) 829-2602
E-mail: poushinskyg@guelph.operation1

Food Research Program
93 Stone Road West
Guelph, Ontario
N1G 5C9

Western Region

Brandon Research Centre

Fields of Research

Soil and plant science: soil management and fertility, soil/plant interactions, biochemistry (heavy metal uptake), weed and crop ecology, manure management, systems agronomy, soil microbiology, soil management and conservation, crop production pathology, crop micrometeorology, weed management, barley breeding, barley biotechnology, barley genetics. Animal science: forage agronomy and pasture management, nutrition and production systems in beef cattle.

Contact

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E-mail: rkucey@em.agr.ca

Brandon Research Centre
P.O. Box 1000A,R.R.3
Brandon, Manitoba
R7A 5Y3

Cereal Research Centre

Fields of Research

Breeding, genetics, cytogenetics, quality, and biotechnology of wheat, oats, and barley; cereal pathology, including biotechnical, genetic, and biochemical approaches; biology and control of pests in stored grains, including mycotoxicology.

At the Morden Research Centre: breeding and genetics of flax, field peas, and woody and herbaceous ornamentals; plant pathology and disease resistance; crop management of field crops, oilseeds, and nursery crops.

Contact

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Director
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Cereal Research Centre
195 Dafoe Road
Winnipeg, Manitoba
R3T 2M9

Saskatoon Research Centre

Fields of Research

The Centre and its research farms bring a long-term commitment in crop research to the agri-food industry in western Canada. The Centre's focus is on; improved germplasm of oilseed and forage crops; crop production and pest control practices, including biological control, for the Parkland region; processes and products that expand the utilization of prairie crops; and conservation, documentation and distribution of diverse germplasm by Plant Gene Resources of Canada.

Each program has strong input from biotechnology and chemistry.

Contact

Dr. P.A. O'Sullivan
Director
Tel.: (306) 956-7200
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E-mail: osullivanpa@em.agr.ca

Saskatoon Research Centre
Melfort Research Farm
Scott Research Farm
107 Science Place
Saskatoon, Saskatchewan
S7N 0X2

Semiarid Prairie Agricultural Research Centre

Fields of Research

Breeding, genetics, and agronomy of wheat, rye, and forage grasses; soil and crop management alternative crop production systems; pasture management; agrometeorology; hydrology and salinity control; tillage research; equipment design; and economics of production systems, focused on the semi-arid regions of the southern prairies.

Contact

Dr. W. Lindwall
Director
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E-mail: lindwallw@em.agr.ca

Semiarid Prairie Agricultural Research Centre
P.O. Box 1030
Swift Current, Saskatchewan
S9H 3X2

Lacombe Research Centre

Fields of Research

Meat research: meat safety; effects of ante-mortem stress on animal welfare and meat quality; computer vision systems for carcass yield and quality prediction; development of meat grading systems; carcass and meat quality traits; molecular genetics; post-mortem processing technology; storage life, preservation, hygiene, and packaging; taste panel and consumer preference for red meat products (beef, pork, lamb, elk, bison, ostrich, etc.).

Forage/beef research: reduction of production costs in the forage-based cow/calf sector of the beef industry; pasture production; production systems for beef herds; forage management and preservation; forage seed production.

Plant research: oat breeding (Lacombe site); canola breeding, honey bee management, nutrient cycling, and soil biology (Beaverlodge site); weed control in cereals, canola, field peas, and forage crops; reduced input weed control; sustainable cropping systems (Lacombe and Beaverlodge sites).

Contact

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Director
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E-mail: baileyd@em.agr.ca

Lacombe Research Centre
6000 C&E Trail
Lacombe, Alberta
T4L 1W1

Lethbridge Research Centre

Fields of Research

Crops: wheat, pulse, potato, and forage crops development; management of diseases, insect pests, and weeds, including biological control; agronomy; molecular biology.

Soils and climate: agrometeorology; conservation; composting; manure management; economics; remote sensing; agronomy; physics; organic chemistry; microbiology; carbon cycling; range management, ecology and integrated resource management in Alberta and British Columbia.

Beef and dairy cattle and sheep: livestock pest management, including parasitology, immunology, insect ecology, and biological control; feed biotechnology and microbiology; ruminant nutrition, genetics and physiology; image analysis and electron microscopy; economics.

Contact

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Lethbridge Research Centre
P.O. Box 3000
Lethbridge, Alberta
T1J 4B1

Pacific Agri-Food Research Centre (PARC)

Fields of Research

Horticultural and field crop production and protection, including tree fruits (especially apple and sweet cherry), small fruits (especially strawberry and raspberry), vegetables, specialty crops, and forages; food science and technology for horticultural and specialty crops; molecular and cellular biology of viral, bacterial, and fungal pathogens of crops, including the development of diagnostic methods; poultry nutrition; and land resource evaluation. Included are development of sustainable integrated greenhouse and field crop production systems; soil and water resource management, including fertigation; integrated management of insect pests and diseases, including biological control; animal waste management, composting technologies and compost utilization; crop modelling; cultivar and rootstock breeding and evaluation; food chemistry, microbiology, processing, and engineering; sensory evaluation and enology; and crop storage, including post-harvest physiology and pathology.

Contact

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E-mail: neishg@em.agr.ca

Pacific Agri-Food Research Centre (PARC)
Highway 97
Summerland, British Columbia
V0H 1Z0

Canadian Grain Commission

Grain Research Laboratory

The Grain Research Laboratory is the scientific division of the Canadian Grain Commission. Research objectives include:

- to characterize and measure end-use suitability of Canadian grains;
- to develop improved understanding of the physical, chemical, biochemical, and technological properties of Canadian grains; and
- to develop rapid methods and instrumentation to measure quality components and performance specifications of Canadian grains.

Fields of Research

Identify and characterize properties, quality components, and end-use performance of major Canadian grains: cereal grains (common wheat, durum wheat, and barley); oilseeds (canola, flaxseed, soybeans, sunflower seed, and mustard seed); pulses (field peas, field beans, and lentils).

Specific research applications to Canadian grains include: analysis and method development for detection and measurement of trace elements, pesticide residues, and mycotoxins; near-infrared spectroscopy, image analysis, high-resolution digital photography, and light, fluorescence, and scanning electron microscopy for development of rapid instrumental grain analysis methods and grain quality assessment; laboratory- and pilot-scale milling of wheat into flour and semolina; laboratory- and small-scale processing and instrumentation for dough making and bread baking; laboratory-scale pasta processing of semolina for the evaluation of durum wheat quality parameters; laboratory-scale noodle processing and specialized instrumentation for the evaluation of end-product quality; pilot- and laboratory-scale systems to evaluate malting-type barleys; analysis of activity of cereal enzymes, particularly alpha-amylase; chemistry of oilseeds as studied by high-performance liquid chromatography, gas-liquid chromatography and NIR; biochemical and biotechnological methods for laboratory identification of grain varieties, including electrophoresis, immunoassay and DNA fingerprinting; analysis, measurement, and chemistry of protein, starch, moisture, and other grain constituents; and mycology of grains, with emphasis on mycotoxigenic fungi.

Contact

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Grain Research Laboratory
1404-303 Main Street
Winnipeg, Manitoba
R3C 3G8

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Canadian Food Inspection Agency

The Canadian Food Inspection Agency's mandate is to enhance the effectiveness and efficiency of federal inspection and related services for food and animal and plant health.

Our Mission: Safe food, market access, consumer protection.

Our Objectives: To contribute to a safe food supply and accurate product information; to contribute to the continuing health of animals and plants for protection of the resources; and to facilitate trade in food, animals, plants and their products.

The Canadian Food Inspection Agency provides a range of laboratory services across Canada, including: chemical, microbiological and physical analytical services related to foods, feeds, fertilizers and seeds; diagnostic testing standards, technology development and transfer, laboratory accreditation, scientific advice and analytical capability for animal, fish and plant diseases and pests; technical expertise to support the development and operation of evolving inspection practices; and responding to consumer complaints.

Contact

Dr. Robert C. Clarke
Executive Director
Laboratories Directorate
Tel.: (613) 225-2342
Fax: (613) 228-6634
E-mail: clarker@em.agr.ca

Canadian Food Inspection Agency
59 Camelot Drive
Ottawa, Ontario
K1A 0Y9

The Agency laboratories are divided into four area networks:

Atlantic Laboratory Network

Laboratories located in Charlottetown, Prince Edward Island; Dartmouth, Nova Scotia; Moncton, New Brunswick; and St. John's, Newfoundland, work in the areas of potato diseases; retrovirology; assays of marine biotoxins; fish chemistry and microbiology; sensory evaluation of fish and seafood products; foodborne pathogens; and food chemistry, including detection of mycotoxins and food allergens.

Contact

Dr. Robert G. Stevenson
Director
Centre for Animal and Plant Health
Tel.: (902) 368-0950
Fax: (902) 368-0960
E-mail: stevensonr@em.agr.ca

93 Mount Edward Road
Charlottetown, Prince Edward Island
C1A 5T1

Quebec Laboratory Network

Laboratories located in St-Hyacinthe and Longueuil, Quebec, work in the areas of porcine indigenous diseases, and detection of chemical residues and foodborne pathogens in fish and food products.

Contact

Dr. Judith Bossé
Acting Director
Health of Animals and Food Lab
Tel.: (514) 773-7730
Fax: (514) 773-8152
E-mail: bossej@em.agr.ca

3400 boul. Casavant West
St-Hyacinthe, Quebec
J2S 8E3

Ontario Laboratory Network

Laboratories located in Mississauga, Scarborough and Ottawa, Ontario, work in the areas of avian and mycobacterial diseases, brucellosis, rabies, germplasm (semen and embryos of domestic livestock); evaluation of veterinary biologics; plant quarantine pests; foodborne pathogens of fish and food; and detection of residues and adulterants in foods.

Contact

Dr. Peter Ide
Director
Animal Diseases Research Institute/
Centre for Plant Quarantine Pests
Tel.: (613) 228-6698
Fax: (613) 228-6660
E-mail: idep@em.agr.ca

3851 Fallowfield Road
Ottawa, Ontario
K2H 8P9

Western Laboratory Network

Laboratories located in Winnipeg, Manitoba; in Saskatoon, Saskatchewan; in Lethbridge and Calgary, Alberta; and in Burnaby and Saanichton, British Columbia, work in the areas of animal parasitology, bovine and equine indigenous viral diseases, foreign animal diseases, leptospirosis, anthrax, anaplasmosis, and diseases of non-traditional livestock; plant viral and phytoplasmal diseases; microbiology and chemical analyses of fish and seafood products; marine biotoxin assay; analyses and certification of seeds; analyses of foods, feeds, and fertilizers for pesticide and drug residues and for PCBs; detection of foodborne pathogens, food allergens and mycotoxins.

Contact

Dr. William D.G. Yates
Director
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E-mail: yatesw@em.agr.ca

Animal Diseases Research Institute
Gask Road, P.O. Box 640
Lethbridge, Alberta
T1J 3Z4

Visit our Web site at http://www.cfia-acia.agr.ca

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Canadian Space Agency

Established in March 1989, the Canadian Space Agency (CSA) derives its authority from the *Canadian Space Agency Act*, sanctioned in December 1990.

The Canadian Space Agency is committed to leading the development and application of space knowledge for the benefit of Canadians and humanity.

Innovations in Canada's space sector are helping to promote a more competitive space industry, generate spin-off technologies here on Earth, develop high-tech expertise, and create new jobs for Canadians. Spin-offs from the Canadian Space Program leverage investments in key technologies, thereby increasing the social and economic benefits that all Canadians obtain from space activities.

Space Technology programs are helping industry develop strategic technologies in specific niches and establish links with foreign firms, improving access to international markets. The CSA is targeting numerous Canadian industries, most often in collaboration with small and medium-sized enterprises, to accelerate the transfer of space technologies to non-space applications. These industries include oil and gas exploration, geology, mining, transportation, forestry, and agriculture. Each stands to benefit from the application of space technologies to conventional methods of Earth-based operations.

In collaboration with universities, industry, research and development centres and other government agencies across Canada, the CSA contributes to further expanding leadership in areas of critical importance to Canada:

Earth and Environment

The Canadian Space Program contributes to better understanding, monitoring and predicting of the Earth's environment and global climate change, as well as to the enhancement of the management of natural resources and disasters. This is accomplished through the application of space-based technologies and research based on unique scientific data provided by Earth observation satellites.

The major achievement in this line is without contest RADARSAT-1, used around the world, and most remarkably in disaster management. The new millennium will see the birth of its successor, RADARSAT-2.

Space Science

Canada's Space Science Program ensures that this country maintains a position of excellence in the worldwide exploration and utilization of space. Moreover, it contributes to government objectives and international commitments related to global climate change, and health through life sciences activities. With these programs, the CSA is at the forefront of ozone measurement and atmospheric analysis.

Human Presence in Space

Includes the Canadian Astronaut Program and the Operational Space Medicine Program. The Canadian Astronaut Program was established in 1983, when the United States invited Canada to fly an astronaut on its space shuttle. This invitation led to the creation of a permanent corps of Canadian astronauts to coordinate and conduct Canadian experiments in space. This service line is actively involved in the International Space Station project, with our astronauts contributing to its construction, and ground facilities training cosmonauts and astronauts for use of the Mobile Servicing System. The Operational Space Medicine Program has a commitment to maintain and enhance Canadian expertise in space medicine in support of the participation of Canadians in the human exploration of space.

Satellite Communications

The Canadian Space Program supports the satellite communications industry in expanding the global information infrastructure. By doing this, it is helping Canada become the most connected nation in the world.

Space Technologies

Comprises Space Technologies, Spacecraft Engineering, Spacecraft Payloads, Technology Management, Software and Ground Segment and Exploratory programs. Space Technology programs are helping industry develop strategic technologies in specific niches, establish links with foreign firms, and improve access to international markets. One of our greatest achievements in space technology is the Canadarm, which is now followed by the Space Shuttle Remote Manipulator System and the Mobile Servicing System of the International Space Station.

Space Qualification Services

The David Florida Laboratory (DFL) is Canada's world-class spacecraft assembly, integration, and testing centre, maintained and operated by the Canadian Space Agency. Operated on a fee-for-service basis, the DFL is available for use by Canadian and foreign aerospace and telecommunications companies and organizations for qualifying their hardware bound for space. Since its inception in 1972, the laboratory has supported a number of major projects.

These projects include the Communications Technology Satellite (CTS, renamed HERMES); the Space Shuttle Remote Manipulator System (CANADARM); BRASILSAT S1 and S2 communications satellites; the European Space Agency's Olympus communications satellite; Telesat Canada's ANIK C–, D–, and E-series communications satellites; the MSAT M1 and M2 mobile communications satellites; RADARSAT-1, Canada's first Earth observation satellite; and INDOSTAR, an Indonesian communications satellite.

Directorate of Spacecraft Engineering

Fields of Research

The Space Technologies Branch of the Canadian Space Agency is the functional centre for technical expertise in the development of advanced technologies for space applications. It is also mandated to lead the development of space technologies within the CSA, to enhance Canadian industrial competitiveness, and to support Canadian space programs.

The Directorate of Spacecraft Engineering is one of two main technical divisions of the Space Technologies Branch. It is involved in a number of key technological thrusts in the following R&D areas: robotics and intelligent systems; modelling, simulation, real-time implementation; advanced robot control; tele-operation and autonomous robotics and ground control of space robots; contact dynamics modelling, identification of dynamics parameters; flexible manipulators; dynamic emulation of space robots on the ground, modular control and feedback linearization controllers; robots for planetary exploration.

R&D in the areas of spacecraft attitude control systems; smart structures; novel and classical controls; vibration and shape control of flexible space structures.

Space-based structures and testing technologies; lightweight, deployable/inflatable structures; advanced electro/optics; MEMS packaging technologies mechanisms.

Advanced polymeric and metal matrix composites; testing of materials in simulated space environments; smart materials; spacecraft thermal modelling and simulation technologies; novel passive and active thermal technologies.

Microsatellites Development

The directorate has well-equipped laboratories that support the robotics, controls, structures and materials, and thermal group R&D activities.

Contact

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Director
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Directorate of Spacecraft Engineering
Canadian Space Agency
6767 route de l'Aéroport
Saint-Hubert, Quebec

J3Y 8Y9

Directorate of Spacecraft Payloads

Fields of Research

Optical, microwave, and electronic technologies for space applications; active and passive sensors for Earth observation, MMIC, antenna, power systems, power amplifier, microwave design, telemetry, on-board processing, image analysis, data compression; intersatellite links and robot vision.

Contact

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Director
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Directorate of Spacecraft Payloads
Canadian Space Agency
6767 route de l'Aéroport
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Environment Canada

Environment Canada's mandate is to improve the quality of life of Canadians through the preservation and enhancement of the natural environment, including water, air, and soil quality, renewable resources, migratory birds and other wildlife, as well as weather forecasting and warnings.

Environment Canada's mission is to make sustainable development a reality in Canada by helping Canadians live and prosper in an environment that needs to be respected, protected, and conserved.

To this end, Environment Canada undertakes and promotes programs to:

- protect Canadians from domestic and global sources of pollution;
- conserve biodiversity in healthy ecosystems; and
- enable Canadians to adapt to weather and related environmental influences and impacts on human health and safety, economic prosperity, and environmental quality.

The evolving mission of Environment Canada is to provide leadership and play an advocacy role in making sustainable development a reality in Canada.

Environment Canada's Science and Technology

Environment Canada's research and development is conducted principally in seven research institutes with a wide range of partners.

The Meteorological Service conducts research in the atmospheric and hydrological sciences related to climate, meteorology, water quantity, air quality and associated environmental impacts and adaptation. The Environmental Conservation Service conducts research in the aquatic and ecosystem sciences related to water quality, ecotoxicology, and wildlife ecology including endangered species and conservation. The Environmental Protection Service conducts research related to the development of technologies for measuring air pollution and toxic chemicals, for managing industrial and municipal wastes, including wastewater treatment, and for preventing and managing pollution emergencies.

As environmental issues continue to evolve, the Department's capacity to understand, interpret, and forecast on the basis of scientific knowledge will remain of central importance to its work in policy, regulation, and services. Science and technology (S&T) makes it possible to develop environmental technologies that can remediate the problems of the past, forecast the problems of the future, and offer ways to prevent, mitigate, or adapt to the environment of the future.

Departmental Web site: www.msc.ec.gc.ca

Meteorological Service of Canada

Climate Research Branch

Fields of Research

Climate processes and Earth observation: The focus of this group is cold-climate processes in the climate system. The research aims to improve our capability to observe, model, and validate components of the energy and water cycles in cold climates through field and modelling studies and knowledge and effective use of conventional and remotely sensed information. Research into energy and water cycles, placing particular emphasis on the link to surface processes; land surface process modelling and the coupling to GCM and RCM (CLASS model); development and validation of climate processes in hydrological and atmospheric models; climate/cryosphere interactions and processes; scaling of hydrometerological and cloud system processes to GCM scale; remote sensing of climate variables, especially passive microwave remote sensing of the cryosphere; and assessment of errors in in-situ measurements and their compatibility over time.

Special attention is given to the Canadian Global Energy and Water Cycle Experiment (GEWEX) Program and associated investigations of the energy and water cycles; use of the Cryospheric System to Monitor

Global Change in Canada (CRYSYS); and analysis of Boreal Ecosystem Research and Monitoring Sites (BERMS) data.

General circulation modelling: The goal is to develop an improved understanding of the general circulation of the atmosphere and ocean and its interaction with the cryosphere and land surface. The purpose is to provide a physical basis for the treatment of climatic problems, including the assessment of natural and man-made perturbations to the climate system, and to develop climatic prediction techniques to the extent possible. The methods employed include numerical modelling of the general circulation of the atmosphere, ocean, land surface, and cryosphere; biological forcing of the atmosphere; statistical-dynamical modelling of the climate system; and diagnostic studies of observed and model data. Special interests include parameterization of "sub-grid scale" processes, the middle atmosphere, modelling the ocean circulation, and regional-scale climate systems. The modelling work makes extensive use of the Meteorological Service super computing facility.

Climate variability and change: The purpose is to characterize and understand natural climate variability so that the severity and impact of both natural and anthropogenic climate change can be placed in their proper context. This research is conducted with both observed data (including extensive archives of instrumental and analyzed climate data and less extensive proxy data for past climates) and climate models of present, past, and future climates.

Climate monitoring: The primary mandate of this group is to understand the current state of climate and its variability. The group pays particular attention to monitoring and assessing trends in the Canadian and global climate with respect to extreme events. It also investigates and explains climate anomalies, especially those experienced in Canada. It applies expertise to the design of optimal system observing networks in Canada. Specific activities include study of trends and cycles of extreme rainfall, investigation of variability and trends in surface marine wind fields and storms, use of canonical correlation analysis for seasonal climate prediction, and use of borehole ground temperatures as indicators of surface air temperature.

Climate prediction: The objective is to develop a predictive capability on climatic time scales. Areas of interest include atmospheric and oceanic circulation statistics, diagnostic studies of the components of the climate system, statistical and statistical-dynamical models of climate, climatic anomaly forecasting, and the relationship between atmospheric circulation and weather on climatic time scales.

Contact

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Atmospheric and Climate Science Directorate
Climate Research Branch
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

Meteorological Research Branch

Fields of Research

Numerical prediction research: Research in numerical modelling of the atmosphere for the purpose of predicting atmospheric circulation and related weather, including extreme events. The work includes formulation and numerical solution of equations of all those physical processes that can be explicitly treated or parameterized; development of accurate and efficient numerical algorithms; improvement of short-range forecasts (less than 24 hours) through improved mesoscale modelling techniques; improvement of medium-range forecasts (1 to 10 days) through the reduction of systematic errors, particularly those linked with surface parameterizations (water and heat fluxes), stratospheric dynamics, turbulence closures, clouds, precipitation and radiative forcing; development of an extended-range forecast (10 to 90 days) capability by investigating appropriate techniques, particularly ensemble forecasting methods, and effects of sea surface temperature anomalies; development of new forecast techniques and improvement of existing ones for direct numerical weather element prediction.

The work in this division makes extensive use of the AES NEC SX-3/44 computer.

Data assimilation and satellite meteorology: The program focuses on the development of techniques for quantitative application of operational satellite data to weather forecasting and on the development of

techniques for making use of new satellite data. Included are the development of systems for atmospheric sounding, automated merging of weather radar and satellite data to produce short-range precipitation forecasts, and the application of remotely sensed microwave data. The work also includes research and development on data assimilation techniques. The emphasis is on techniques, such as Kalman filtering and four-dimensional variational assimilation, and meso-scale or regional data assimilation using Doppler radars and wind profilers.

Atmospheric processes: The main thrust of research in this area consists of studies of the interactions of airborne solid and gaseous pollutants with clouds and precipitation using aircraft instrumented with cloud physics and air quality measuring systems. This is often done during major field experiments. In addition, the AES operates a 5-cm Doppler weather radar at King City, Ontario, for both research and operational purposes. Continuing development work is being undertaken to provide colour digital display capabilities for operational purposes while conducting research into utilizing Doppler data to recognize severe weather and severe weather precursors.

A major focus for the next few years will be the development of an integrated highly automated nowcasting and very-short-range severe weather forecasting system. Also linked with this topic is the research and development work needed to adapt the present Forecast Production Assistant (FPA) to the nowcasting problem, requiring advances in expert systems and artificial intelligence.

Contact

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Meteorological Research Branch
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

Air Quality Research Branch

Fields of Research

Air quality research: Research is aimed at improving understanding of environmental quality and related processes within the atmosphere. Pollutant transport, dispersion, chemical transformations, and deposition are all under active study. The work is directed towards the priority issues of acid rain, toxic chemicals, photochemical smog, stratospheric ozone, and greenhouse gases and aerosols. Activities include monitoring and the development of measurement techniques, modelling, and field and laboratory experimental studies.

Acid rain: An operational network across Canada permits daily monitoring of the acid rain problem. Analysis of the data is undertaken in conjunction with meteorological data and data from other media such as lakes and rivers. Such analysis develops the understanding necessary to define inter-environmental interactions leading to acid rain impacts.

Many individual processes are studied. For example, dry and wet deposition processes (including fog) are currently under study. As well as the physical processes, gas-phase and heterogeneous chemical transformations are investigated in order to better understand the mechanisms of acid rain production and its impact on human health, biodiversity, and visibility.

Photochemical smog: Research is carried out to increase understanding of the atmospheric processes that lead to the formation of photochemical smog. Investigations of natural sources of ozone, nitrogen oxides, and volatile organic compounds are undertaken as well as studies of the transformations, transport, and deposition of these compounds.

Toxic chemicals: The AES Toxic Chemicals Research Program now includes three facets: participation in the development of a national hazardous air pollutants program; the role played by atmospheric transport in the presence of toxic chemicals in the Great Lakes; the role of the atmosphere in transporting toxics to the Arctic.

A variety of models, from simple trajectory through Eulerian types, are used to describe and assess atmospheric transport of toxic pollutants such as toxaphene and heavy metals. A variety of measurement techniques have been developed for such pollutants as mercury and polycyclic aromatic hydrocarbons. Atmospheric surveys of toxic chemicals are under way around the Great Lakes, and regular monitoring has

begun at Alert in the High Arctic.

Process research is also carried out, including air/sea and air/water transfer of toxics. Chemical reactions of toxics in the atmosphere and the gas/particulate partitioning of toxics are also of interest. Other activities include management of toxic chemical data and model evaluation.

Greenhouse gases: A continuing program of monitoring carbon dioxide, methane, ozone, and other greenhouse gases is carried out at Alert, the world's most northerly monitoring station. Flask samples are also collected for radiatively active analyses at the coastal sites of Estevan Point and Sable Island. Other studies contribute to a better understanding of the global biogeochemical cycle of carbon.

Stratospheric pollution research: Stratospheric pollution studies are conducted in support of regulations on the use of chlorofluorcarbons. Field measurements of ozone and stratospheric trace constituents are undertaken using ground-based remote-sensing techniques and balloon-borne equipment sampling stratospheric air in situ. Measurement techniques from the Space Shuttle and aircraft are also being investigated. The results are used to study the photochemistry of ozone in the stratosphere, especially during the Arctic spring, as well as for correlative studies with stratospheric measurements from satellites. Ground-based observing technology for ozone, nitrogen dioxide, sulphur dioxide, and the ultraviolet ground-level solar spectrum is being developed with the Brewer spectrophotometer.

Solar radiation studies: Solar and terrestrial radiation studies focus on the measurement science associated with the calibration and development of improved instrumentation for the study of the changing surface radiation balance, including the influence of clouds and aerosols. The research is associated with the World Climate Research Program Baseline Surface Radiation Network and the World Radiation Centre.

Contact

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Director
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Air Quality Research Branch
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

Adaptation and Impacts Research Group (formerly Environmental Adaptation Research Group)

Fields of Research

Research activities are designed to make available scientifically sound information on the environmental, social, and economic risks and impacts caused by vulnerabilities to atmospheric change, variability, and extremes; and the viability of adaptive responses (stakeholder and scientific focus to defining viability).

Providing scientific expertise and leadership within the Canadian impacts and adaptation research community: supporting the development of the Canadian scenarios service facility for impacts and adaptation research; providing continuity and guidance in overcoming knowledge and capacity gaps; and promoting and facilitating stakeholder participation in impacts and adaptation research.

Publishing and transferring knowledge as a result of research undertaken to identify, for key Canadian interests, impacts and adaptation responses thereto: water quantity, with a primary focus on international and multi-regional national waters; human health and safety, with a focus on those impacts associated with atmospheric change and extremes, urban areas and infrastructure; weather and climate extremes; integrated assessments, including costing of impacts and adaptation options.

Identifying the "value" of weather and climate services and products as an adaptation in the context of extremes: contribute to the development of a Canadian Weather Research program and develop the capacity to deliver on its socio-economic component; conduct weather radar assessment research project; develop a capacity and undertake a number of case studies toward identifying socio-economic impacts of specific extreme weather events, building on work undertaken for the 1998 ice storm and the Vancouver and Toronto snow storms.

Contact

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Adaptation and Impacts Research Group
Meteorological Service of Canada
4905 Dufferin Street
Downsview, Ontario
M3H 5T4

Environmental Conservation Service

National Water Research Institute

Fields of Research

Ecosystem science; contaminant properties, fate, and effects of toxic substances including endocrine disrupting substances (EDSs); exchange of toxic contaminants between air, water, sediment, and biota; acid/toxic rain effects; groundwater contamination and remediation, lake rehabilitation; ecotoxicology; large basin studies and modelling; climate change/UVB impacts on aquatic ecosystems; analytical methods development; quality assurance and quality control; and potential ecosystem effects of genetically modified organisms (GMOs).

Hydrologic modelling; remote sensing of hydrologic data; hydrology and ecology of cold regions; ice studies; groundwater and contaminants; biotechnological remediation techniques; river, wetlands, and lake ecology, including nutrients, dissolved oxygen, and contaminant interactions; development and validation of ecological indicators of ecosystem integrity; aquatic cotoxicology; impacts of land use on aquatic resources.

Contact

Dr. Janet K. Cooley
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Aquatic Ecosystem Protection Branch
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National Water Research Institute
867 Lakeshore Road
Burlington, Ontario
L7R 4A6

Prairie and Northern Wildlife Research Centre

Fields of Research

Wildlife ecology and conservation, especially habitat selection and population dynamics of prairie waterfowl and Arctic-nesting geese, shorebirds, and songbirds; ecology of, and impacts of forestry on, birds of the boreal forest; impacts of pesticides and other chemical contaminants on wildlife; ecology of prairie wetlands and their wildlife.

Contact

Dr. Robert Clark
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Wildlife Research
Tel.: (306) 975-4087
Fax: (306) 975-4089

Prairie and Northern Wildlife Research Centre
Canadian Wildlife Service
115 Perimeter Road
Saskatoon, Saskatchewan
S7N 0X4

Environmental Protection Service

Environmental Technology Centre (ETC)

Fields of Research

- Measurement of ambient air pollution
- Environmental analytical chemistry
- Measurement of emissions from stationary and mobile sources
- Air pollution prevention and control technologies
- Behaviour and effects of oil and chemical spills
- Remote sensing, field and laboratory techniques for measuring and tracking oil and chemical spills
- Chemical, biological, and physical countermeasures for oil and chemical spills and for cleaning up contaminated sites
- Biological testing methods
- Use of microwaves to enhance physical and chemical processes

Contact

Mike Bumbaco
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Web site: www.etcentre.org

Wastewater Technology Centre

Fields of Research

Development of processes and technologies for treatment and disposal of municipal and industrial wastewaters, and other contaminated media. Research thrusts include industrial pollution prevention, control systems optimization, waste management, site remediation, and bio-treatment processes.

Contact

Dr. David Hay
Manager
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Burlington Environmental Technology Office
867 Lakeshore Road
Burlington, Ontario
L7R 4A6

Centre Saint-Laurent

Fields of Research

Assessment of inflow of toxic substances from the Great Lakes and five tributaries, and their effect on the ecosystem; development of bioassays to assess toxic potential of sediments, contaminated soil, and industrial releases; inventory of the health of fish living in the St. Lawrence River and priority tributaries; dating of contaminants measured in sediments in the Montreal region; inventory and characterization of submerged grassy areas (southeast of Montreal up to Lake Saint-Pierre); acquisition of global mapping knowledge through remote sensing data collection, display, and processing; carrying out of biological and inorganic chemical analyses.

Contact

Lynn Cleary
Director
Tel.: (514) 283-5869

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Centre Saint-Laurent
105 McGill Street, 7th Floor
Montreal, Quebec
H2Y 2E7

NSERC CRSNG Program Guide

Fisheries and Oceans

Aquatic and marine science plays a very important role in the Canadian social and economic fabric. Coastal communities, mariners, industries, and many individual Canadians rely on sound scientific information and advice in their day-to-day life. Fisheries and Oceans is a world-class scientific and technological organization that is connected with the real world and based on leadership, vision, and dedication to excellence. Future challenges include addressing the government's commitment to sustainable development; understanding climate change in relation to the oceans; expanding aquaculture production in a sustainable manner; responding to species-at-risk legislation; and providing a comprehensive science program in the Canadian Arctic.

The Department's science comprises four work activities:

Fisheries and Biodiversity Science: The aim is to provide a reliable scientific basis for the conservation of marine, freshwater, and anadromous fishery resources, for protection and recovery of species at risk, and for conservation of biological diversity in aquatic environments. Scientific data on ocean and coastal populations, species, and ecosystems are collected, analysed and communicated in support of fisheries management, integrated resources management, offshore development, and conservation of the aquatic environment.

Ocean and Aquaculture Science: Department of Fisheries and Oceans (DFO) scientists investigate the effect of ocean climate variability on the productivity of living aquatic resources and the role of the ocean in the global climate system. They develop the Department's capacity to use modern technologies (e.g., satellites, automated floats) to determine and interpret ocean features such as biological productivity, hydrodynamic processes, and surface and water column properties. Also, DFO scientists pursue aquaculture and fish health research leading to technologies and knowledge to culture new species, to prevent the spread of pathogens, and to ensure the safe development of aquaculture.

Habitat Management and Environmental Sciences: The aim is to achieve an integrated, cohesive approach to marine environmental and habitat protection that results in a net gain of habitat. It encompasses the development and implementation of policies, plans, and programs, and the administration of statutes related to the protection and conservation of aquatic habitats and the environment. It also involves investigating and monitoring chemical and physical conditions that affect the quality of aquatic environments; collecting, analysing, and interpreting information to support the sustained economic utilization of Canada's renewable aquatic resources; and assessing, approving, and monitoring activities that affect the quality and quantity of fish habitats.

Hydrography: The mission of the Canadian Hydrographic Service is to provide a reliable scientific basis to enhance the safety and efficiency of navigation for vessels operating in Canadian waters by undertaking field surveys to measure water depth, bottom morphology, bottom type and composition, tides, water levels, near-surface currents, and sound velocity; and compiling and publishing up-to-date, timely and accurate charts and other navigational information on Canadian and adjacent international waters. Hydrographic data are also used to delimit maritime boundaries and to support the exploration and exploitation of maritime resources. Hydrography is a valuable partner in ocean technology development and applications.

Web site: www.dfo-mpo.gc.ca

Newfoundland Region

Northwest Atlantic Fisheries Centre

Fields of Research

Fisheries resource assessment and biology of groundfish, pelagic, shellfish, marine mammal, and diadromous species; life history, ecology, and population dynamics; fisheries ecosystems; aquaculture; habitat research and assessment; physical oceanography; hydrography; toxicology; parasitology; environmental and habitat management.

Contact

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Northwest Atlantic Fisheries Centre
P.O. Box 5667
St. John's, Newfoundland
A1C 5X1

Maritimes Region

St. Andrews Biological Station

Fields of Research

Aquaculture research (salmonids, marine finfish, invertebrates); stock assessments and associated research (groundfish, pelagic fish, invertebrates); environmental research related to fisheries and aquaculture; coastal oceanography.

Contact

Dr. Tom Sephton
Director
Biological Station Manager and
Aquaculture Division Manager
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E-mail: sephtont@mar.dfo-mpo.gc.ca

St. Andrews Biological Station
St. Andrews, New Brunswick
E0G 2X0

Bedford Institute of Oceanography

Fields of Research

Marine Fish Division – Stock assessment of groundfish, pelagics and seals, marine fish population dynamics, biology and ecology, fisheries management studies.

Contact

Dr. Wayne Stobo
Acting Manager
Marine Fish Division
Science Branch
Tel.: (902) 426-3316
Fax: (902) 426-1506
E-mail: stobow@mar.dfo-mpo.gc.ca

Fields of Research

Ocean Sciences Division – Physical: dynamics, climatology modelling, mixing on continental shelves, deep sea and nearshore air/sea interaction; sea ice. Biological: biological and environmental mechanisms underlying marine production, pelagic marine ecology; fisheries ecology. Metrology: applied physics studies towards development of physical, chemical, and biological sensors.

Contact

Dr. R. Allyn Clarke
Acting Manager
Ocean Sciences Division

Science Branch
Tel.: (902) 426-4872
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E-mail: clarkea@mar.dfo-mpo.gc.ca

Fields of Research

Marine Environmental Sciences Division – Marine habitat studies: inshore/offshore molluscan studies; impact of fisheries on fish habitat; contaminant fluxes in Arctic food webs; evaluation of estuarine and continental shelf habitats using ecological models; sublethal effects of hydrocarbon exploration. Ecology: deep ocean food webs; primary (picoplankton) and secondary (copepods) production studies; development of ecological models; benthic-pelagic exchanges. Biochemical indicators of health of aquatic animals, detection and risk assessment of organic chemicals in fish and environment samples. Chemical: inorganic, and radionuclide matter.

Contact

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Manager
Marine Environmental Sciences Division
Oceans Branch
Tel.: (902) 426-6138
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Fields of Research

Invertebrate Fisheries Division – Stock assessment of marine and anadromous fish; population dynamics; population biology; ecology; genetics of wild stocks; fisheries management studies; Aboriginal fisheries; modelling. Population biology and assessments of commercial invertebrate species, particularly snow crab and lobsters; invertebrate population modelling.

Contact

Dr. René Lavoie
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Invertebrates Fisheries Division
Science Branch
Tel.: (902) 426-2147
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E-mail: lavoieR@mar.dfo-mpo.gc.ca

Fields of Research

Diadromous Fish Division – Field-oriented research programs on population assessment of diadromous species, particularly Atlantic salmon; salmon enhancement programs, involving biological investigations, engineering technology, and fish culture conducted to expand and rehabilitate stocks in selected rivers. Freshwater habitat research programs are conducted to assess the effects of forestry and other land-use practices on fish stocks.

Contact

Dr. Larry Marshall
Manager
Diadromous Fish Division
Science Branch
Tel.: (902) 426-3605
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E-mail: marshallL@mar.dfo-mpo.gc.ca

Fields of Research

Habitat Management Division – Mechanisms of harmful algae blooms and improvements in forecasting of related toxic events. Toxic contaminants in fish.

Contact

Mr. Brian D. Thompson
Manager

Habitat Management Division
Oceans Branch
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P.O. Box 1006
Dartmouth, Nova Scotia
B2Y 4A2

Gulf Fisheries Management Region

Gulf Fisheries Centre

(Bilingual work environment)

Fields of Research

Science Branch, Gulf Region – Stock assessment of marine and anadromous fish; invertebrates; aquaculture; fish health; population dynamics; population biology; ecology; fisheries management studies; Aboriginal fisheries; modelling. Population biology and assessments of commercial invertebrate species, particularly snow crab and lobsters; invertebrate population modelling.

Contact

Dr. Mike Chadwick
Director
Science Division
Science Branch
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P.O. Box 5030
Moncton, New Brunswick
E1C 9B6

Laurentian Region

Maurice Lamontagne Institute

Fields of Research

Fish and Marine Mammals Division – Fisheries research, stock assessments of fish; scientific advice for optimal management of stocks; fisheries oceanography; effects of environmental conditions and trophic relationships on the survival and growth of juvenile fish; population dynamics; fisheries acoustics, bioacoustics; genetics; physiology; energetics; migrations; ecology of the Estuary and Gulf of St. Lawrence. Biology of marine mammals: systematics and genetics, ecology, energetics, and behaviour. Distributions, movements, and population dynamics.

Contact

Mr. Serge Gosselin
Manager
Fish and Marine Mammals Division
Tel.: (418) 775-0637
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Fields of Research

Invertebrates and Experimental Biology Division – Invertebrate fisheries research, stock assessment of invertebrates and fish; scientific advice for optimal management of stocks; aquaculture research (scallops, mussels, cold water fish etc.); effects of environmental conditions and trophic relations on growth and survival of invertebrates; population dynamics; genetics; physiology; energetics; migrations; ecology of the

Estuary and Gulf of St. Lawrence.

Contact

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Manager
Invertebrates and Experimental
Biology Division
Tel.: (418) 775-0631
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E-mail: GasconD@dfo-mpo.gc.ca

Fields of Research

Division of Ocean Sciences – Biological oceanography: biomass and primary production processes; secondary production processes; zoo- and ichthyoplankton larval recruitment relationships; general ecosystem studies in the estuarine and coastal environments. Physical oceanography: circulation and mixing due to freshwater influx; wind and tides; internal waves; remote sensing; numerical modelling. Chemical oceanography: carbon flux process.

Contact

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Manager
Ocean Sciences Division
Tel.: (418) 775-0595
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Fields of Research

Environmental Sciences Division – Contaminants science; marine geochemistry; water-sediment-biota interactions; ecotoxicology and pathology of aquatic organisms; analytical chemistry; hydrocarbons. Marine ecosystem health and habitat science.

Contact

Mr. Michel Gilbert
Acting Manager
Environmental Sciences Division
Tel.: (418) 775-0703
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Fields of Research

Marine Geomatics Engineering Division, Canadian Hydrographic Service – Depth measurement by acoustical methods; tidal phenomena; precise positioning (Global Positioning Systems); electronic navigation chart; hydrographic data collection, protection, and management; computer aided cartography (CAC); geographic information systems (GIS).

Contact

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Marine Geomatics Engineering
Division
Canadian Hydrographic Service
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850, route de la mer
P.O. Box 1000
Mont-Joli, Quebec
G5H 3Z4

Central and Arctic Region

Freshwater Institute Science Laboratory

Fields of Research

Whole lake ecosystem studies including primary and secondary productivity; ecology of freshwater fish; impacts of physical disruptions on fish habitat; impacts of toxic chemicals on freshwater ecosystems; environmental toxicology; fish health; ecosystem dynamics of contaminants; biology of Arctic marine and anadromous species; population dynamics of Arctic fish and marine mammals; fish habitat; species at risk.

Contact

Mr. Terry Shortt
Manager
Environmental Science Division
Tel.: (204) 983-5062

Freshwater Institute Science Laboratory
501 University Crescent
Winnipeg, Manitoba
R3T 2N6

Fields of Research

Ecosystem studies on the Great Lakes focusing on lower trophic dynamics and food Web interactions; impacts of exotic species on diversity, production and energy flow; risk assessment to prevent further introductions; the effects of habitat alteration on the productive capacity of fish habitat; new toxic chemicals in Great Lakes fish and monitoring of the spatial and temporal trends of contaminant levels in aquatic biota; effects of toxic chemicals on ecosystem structure and function; effects of aquaculture on freshwater ecosystems; and research to protect and recover species at risk.

Contact

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Great Lakes Laboratory for
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Great Lakes Laboratory for Fisheries
and Aquatic Sciences
Canada Centre for Inland Waters
867 Lakeshore Road
Burlington, Ontario
L7R 4A6

Pacific Region

Institute of Ocean Sciences

Fields of Research

Physical oceanography of processes occurring in fjords and over the continental shelf of the Northeast Pacific and Western Arctic; large-scale ocean circulation; sea ice-ocean interaction; numerical modelling; remote sensing. Chemical oceanography on distribution, flux, and fate of chemicals and processes between sediment, biota, atmosphere, coastal waters, and open ocean; climate research; monitoring and modelling on air-sea flux and upper-deep ocean exchange of CO^2, climatic gases, and biogeochemical cycles. Biological oceanography with major emphasis on phytoplankton, zooplankton, and benthic infauna; mesoscale distribution of organisms and interactions with physical forcing such as advection and mixing, light adaptation of phytoplankton; zooplankton feeding and swimming behaviour; habitat and carrying capacity; fish-forestry interactions.

Contacts

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Marine Environment and Habitat
Sciences Division
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Institute of Ocean Sciences
P.O. Box 6000
9860 West Saanich Road
Sidney, British Columbia
V8L 4B2

Pacific Biological Station

Fields of Research

Stock assessments and population dynamics of salmon, herring, groundfish, and marine invertebrates; recruitment mechanisms; salmonid enhancement science; aquaculture of salmon and marine finfish; parasites and fish health; habitat and carrying capacity; fish-forestry interactions; biotechnology and applied endocrinology; DNA stock identification.

Contacts

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Ted Perry
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Pacific Biological Station
3190 Hammond Bay Road
Nanaimo, British Columbia
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NSERC CRSNG Program Guide

Health Canada

Healthy Environment and Consumer Safety Branch

Safe Environments Directorate

Safe Environments Laboratories

Lab investigations into the chemical characterization of air pollutants; animal studies to determine the toxicity of single- and multi-pollutant exposures; exposure assessments and modelling research; national surveys and epidemiological studies; development of biomarkers for reproductive and mutagenic effects.

Contact

D. Blakey
Acting Director
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Fax: (613) 941-9238

Safe Environments Laboratories
Healthy Environment and Consumer
Safety Branch
A/L 0801B3 Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Bureau of Radiation Protection

Fields of Research

Assessment of radioactivity and radiation in natural home and occupational environments, including external, internal, and molecular dosimetry; use of radionuclides as atmospheric tracers for ozone and particulate transport; impact of radiation on human health, human uptake and metabolism; epidemiology; medical assessments of exposures; development of quality assurance programs; guidelines and standards for exposures; dispersion and dose assessment capabilities for emergency response; and monitoring and laboratory capabilities for the Comprehensive Nuclear Test Ban Treaty.

Contact

Director
Tel.: (613) 954-6647
Fax: (613) 952-9071

Bureau of Radiation Protection
Safe Environments Directorate
Healthy Environments and Consumer
Safety Branch
A/L 6302A, 775 Brookfield Road
Ottawa, Ontario
K1A 1C1

Consumer Safety Directorate

Fields of Research

Conducts scientific analysis, provides expert advice, and develops standard test methodologies for mechanical, chemical, and flammability hazards associated with consumer products.

Contact

C. Ethier
Director General
Tel.: (613) 946-1443
Fax: (613) 946-1100

Consumer Safety Directorate
A/L 3504D, 123 Slater Street
Ottawa, Ontario
K1A 0K9

Health Products and Food Branch

Therapeutic Products Directorate

The Therapeutic Products Directorate strives to ensure that the drugs available in Canada are safe, effective, and of high quality:

- by assessing their benefits and risks effectively, continually, and in a timely manner (benefit/risk assessment);
- by managing their risks appropriately (risk management); and
- by developing and disseminating information that encourages their optimal use (information management).

Bureau of Biologics and Radiopharmaceuticals

Fields of Research

Assessment and investigations of the safety and efficacy of biological drugs such as vaccines, interferon, insulin, hormones, allergenic extracts, blood derivatives, monoclonal antibodies, and drugs made by recombinant DNA techniques; development of standards and analytical methods; methods of detection of potential contaminants in biological drugs.

Contact

Director
Tel.: (613) 957-8064
Fax: (613) 957-6302

Bureau of Biologics and
Radiopharmaceuticals
Drugs Directorate
Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Bureau of Drug Research

Fields of Research

Synthesis and authentication of drug reference standards; analytical methods and specifications for drug raw materials and finished products; analysis of licit and illicit drugs; bioavailability and pharmacokinetic studies of drugs and metabolites and development of assay methods and statistical analysis of data; biotechnology studies of the molecular, biochemical, and genetic basis of disease; alternative preclinical screening methodology; physico-chemical assessment of biotech products; toxicological drug research in laboratory animals and in vitro; mutagenicity and carcinogenicity testing methods; studies of endocrine and immune systems; reproductive toxicology; blood, blood products, and tissues and organs.

Contact

Director
Tel.: (613) 957-1058
Fax: (613) 941-5035

Bureau of Drug Research
Sir Frederick Banting Bldg.
A/L 2203G5 Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Bureau of Medical Devices

Fields of Research

Our mission is to maintain and improve the health of Canadians by ensuring that medical devices sold in Canada are safe and effective. In support of the mission, a multidisciplinary team of Bureau scientists and engineers conducts laboratory-based research into the surface properties and stability of biomaterials, release of toxic compounds from biomaterials, electromagnetic interference, the safety and effectiveness of electromedical devices, breathing devices, and in vitro diagnostic kits.

Contact

Director
Tel.: (613) 957-4786
Fax: (613) 967-7318

Bureau of Medical Devices
Environmental Health Directorate
A/L 0301H1 Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Food Directorate

The Food Directorate's function is to protect and improve the health and well-being of the Canadian public by defining, advising on, and managing risks and benefits associated with the food supply. Areas of work include food additives, chemical and microbiological contaminants, nutrients, novel foods, food components, and food processes such as irradiation, as well as veterinary drugs.

The Directorate is responsible for the development of appropriate policies, procedures, regulations, and guidelines directed towards the achievement of a high standard of safety and nutritional quality of foods and the safety and efficacy of veterinary drugs. These responsibilities are carried out through coordinated programs of scientific research, evaluation, and regulatory activities under the authority of the *Food and Drugs Act* and *Regulations*.

Food Directorate staff participate in the work of national and international groups such as the Canada Committee on Food, FAO/WHO Joint Expert Committees on Pesticide Residues and Food Additives, the U. S. National Research Council Food and Nutrition Board Committee on Codex Specifications, and the Codex Alimentarius Commission Committee on Residues of Veterinary Drugs in Foods. Staff are also actively involved in intergovernmental and international activities and provide advice to federal, provincial, and other agencies and to the general public.

Research is carried out in three bureaus of the Food Directorate. A description of their activities follows.

Bureau of Chemical Safety

Fields of Research

Food Research: The Food Research Division engages in a range of research activities related to the identification, determination, distribution, and sources of potentially hazardous chemicals in the food supply. The Division is also responsible for the development of appropriate methodology for use by Regional Food Laboratories and the Canadian Food Inspection Agency.

Contact

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Acting Chief
Food Research Division
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Bureau of Chemical Safety
Sir Frederick Banting Building
A/L 2203D Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Fields of Research

Toxicology Research: The Toxicology Research Division is responsible for the identification and investigation of potential health hazards associated with chemical contaminants including natural food toxicants as well as chemicals of environmental origin entering the food chain, and food additives. Research is carried out on the carcinogenic, mutagenic, teratogenic, and other potentially toxic effects of these chemicals, including effects on behaviour and the immune system.

Contact

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Chief
Toxicology Research Division
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Bureau of Chemical Safety
Sir Frederick Banting Building
A/L 2202D1 Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Bureau of Nutritional Sciences

Fields of Research

The Nutrition Research Division conducts research on the nutritional and metabolic aspects of foods in support of policy development, standard setting, and risk assessment related to the nutritional quality and safety of the Canadian food supply. The Division also develops and evaluates analytical methods for nutrients and studies the relationship of certain aspects of the diet to disease conditions. It also has the mandate to conduct food consumption and nutrient intake surveys in collaboration with the Bureau of Biostatistics and Computer Applications and provincial health departments. The Division also maintains and markets the Canadian Nutrient File, Canada's database on the nutrient content of foods.

Contact

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Nutrition Research Division
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Bureau of Nutritional Sciences
Sir Frederick Banting Building
A/L 2203C Tunney's Pasture
Ottawa, Ontario
K1A 0L2

Bureau of Microbial Hazards

Fields of Research

The Food Microbiology Research Division studies the safety of foods with respect to infectious and toxigenic organisms, defines the conditions leading to survival, growth, and toxin production of these organisms and recommends measures of control. The Division also develops methods for detecting micro-organisms, toxins, parasites and provides analytical assistance to other departments. In addition to research, the Division is responsible for the operations of the Botulism Reference Centre, the Listeriosis Reference Service, and the Foodborne Disease Reporting Centre.

Contact

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Bureau of Microbial Hazards
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Ottawa, Ontario
K1A 0L2

Population and Public Health Branch

Centre for Infectious Disease Prevention and Control

The Centre for Infectious Disease Prevention and Control promotes improvement in population health status in the area of infectious diseases through public health action. Its objectives are to decrease transmission of infectious disease and to improve the health status of those infected.

The Centre is composed of:

- Bureau of HIV/AIDS STD and TB
- Bureau of Infectious Diseases
- Hepatitis C Division
- HIV/AIDS Policy, Coordination and Programs Division

Bureau of HIV/AIDS, STD and TB

The Bureau of HIV/AIDS, STD and TB provides leadership and expertise in the collection, analysis, interpretation, and dissemination of HIV/AIDS, sexually transmitted disease (STD) and tuberculosis (TB) data required for risk assessment and evidence-based public health interventions on a national and international level. This is achieved through coordinating national and international surveillance, field investigation, and applied research and laboratory science.

Contact

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Bureau of HIV/AIDS, STD and TB
Brooke Claxton Buidling
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PL0900B1, Tunney's Pasture
Ottawa, Ontario
K1A 0K9

Bureau of Infectious Diseases

The Bureau of Infectious Diseases provides leadership and expertise in infectious diseases of national, provincial or territorial importance. Through surveillance of infectious diseases; identification and quantification of risk factors and emerging threats to health; assessment of proposed prevention strategies; evaluation of existing surveillance, prevention, and control activities; and the pursuit of research initiatives, the Bureau creates, gathers, analyses and disseminates information data integral to the development of public health policy.

Contact

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Hepatitis C Division

The Hepatitis C Division was established in December 1998 to design, develop, and implement programs that will prevent hepatitis C infection, support people infected with or affected by the disease and increase public awareness, as well as manage the financial arrangements for the Settlement Agreement. The Division administers the $50-million Hepatitis C Prevention, Support and Research Program; a special transfer to the provinces of $300 million over 20 years; and $25-$50 million to cover half the cost of provincial and territorial hepatitis C look-back/trace-back initiatives. The Division acts as the focal point for a population health approach to hepatitis C and ensures a coordinated and integrated federal response to this issue.

Contact

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Hepatitis Division
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HIV/AIDS Policy, Coordination and Programs Division

The HIV/AIDS Policy, Coordination and Programs Division serves as the focal point for Health Canada in the coordination, implementation, and monitoring of the Canadian Strategy on HIV/AIDS (CSHA). The HIV/AIDS Division plays a central role in moving the Strategy toward a nationally shared vision with improved collaboration among all levels of governments, among communities, non-governmental organizations, professional groups, institutions, and with the private sector. The Division also provides national expertise on key activities under the CSHA such as strategy management, policy development and information synthesis, prevention and care, treatment programs, marketing and communications, and strategy monitoring and evaluation.

Contact

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NSERC CRSNG Program Guide

Industry Canada

Communications Research Centre

An Agency of Industry Canada

Communications Research Centre
3701 Carling Avenue
P.O. Box 11490, Station H
Ottawa, Ontario
K2H 8S2
Tel.: (613) 991-3313
Web site: www.crc.ca

Satellite Communications Research

Fields of Research

Advanced satellite communications concepts, analysis, and design, including OBP, EHF technology, LEO/GEO; satcom terminal development, at L-Band for land, sea, and aeronautical mobile, and at Ka-Band for multimedia communications terminals; military satcom – EHF and optical; modulation and coding; communications payload development; personal communications satcom.

Contact

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Satellite Communications Research
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Integrated Electronics Research

Fields of Research

The laboratories are concerned with the future electronics-enabling technologies required to support the departmental initiatives in communications and information technology. This includes satellite communications, military communications, and spectrum-effective communications. Included are responsibilities for carrying out research and development activities on devices, circuits, and components for application to high-frequency microwave/millimetre wave communications systems and high-speed data processing.

Contact

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Optoelectronic Materials and Components Research

Fields of Research

This research activity is aimed at the development of novel, low-cost optical and optoelectronic components and devices that increase the capacity, versatility, and performance of fibre optic broadband networks. There are two main research areas:

1. Optoelectronic Circuits involves the design and fabrication of high-speed, photodetector-based optoelectronic circuits that can be used for high-speed switching and network access/monitoring, as well as for highly specialized satcom applications. Part of this activity includes the growth and characterization of novel semiconductor materials and structures that can be used to fabricate optoelectronic devices with improved performance and reliability and lower cost.
2. Photonic Component Technologies involves the design, fabrication, and testing of novel photonic devices based on dielectric and polymer materials.

Research in this group targets the development of passive photonic devices for wavelength demultiplexing, filtering, and routing, as well as more complex "value-added" components exploiting materials with novel optical properties such as photosensitivity or optical nonlinearities.

Contact

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Optoelectronic Materials and Components Research
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Optical Communications and Electrophotonics Research

Fields of Research

The photonics research program is focused on photosensitivity in optical waveguides and its use in fabrication of a wide variety of passive devices. A capability to fabricate planar and channel waveguides using PECVD is also being developed. The principal application is passive components in optical communications, especially for WDM (Wavelength Division Multiplexing). The two principal thrusts in WDM are optical Add/Drop filters and chromatic dispersion compensation. The Add/Drop filter based on Mach-Zehnder interferometer and photo-induced Bragg gratings, which were invented at CRC, is a versatile filter used to add/drop individual channels from a WDM transmission stream.

Chromatic dispersion compensation, which also originated at CRC, uses long-fibre Bragg gratings with variable periods to compensate for chromatic dispersion in fibre at high data rates. So far, individual WDM channels are compensated separately, but now longer gratings are needed to compensate an entire WDM window at a time.

Contact

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Radio Science Research

Fields of Research

CRC is the Canadian national centre for propagation research across the entire radio spectrum. The research program concentrates on propagation problems peculiar to Canadian latitudes, with a view to applying the results to current and future domestic communications systems. The main interest is in the limitations of the transmission medium, particularly the lower atmosphere, and the effect of such limitations on the allocation and sharing of the radio frequency spectrum. Research on the application of propagation knowledge to predictions of communications system performance includes modelling the radio propagation environments: ionosphere, troposphere, and terrain.

Contact

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Radio Communications Technologies Research

Fields of Research

Advanced terrestrial radio communications systems and technologies for fixed, mobile, and personal communications. Includes modelling of transmission channel; channel probing; techniques to mitigate adverse propagation and interference effects; signal design; adaptive equalization and antenna techniques; modulation and coding; digital signal processing; spectrum monitoring/surveillance techniques; speech compression and enhancement techniques; application of encryption techniques for communications security and privacy.

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Networked Media Laboratory

Fields of Research

The Networked Media Laboratory at CRC conducts research on the human and social impacts of new services for global networks, such as the Internet. Most of the research projects undertaken in the Networked Media Laboratory use human-centred design to develop new technologies that will benefit Canadian industry.

Examples of current research areas include the development of natural-language accessible information systems, Web-based distance education, and collaboration in virtual environments.

As well, the Networked Media Laboratory provides expert advice to government and industry about other topics in human-computer interface design and evaluation, as needed. To accomplish this, the Networked Media Laboratory is staffed by scientists trained in experimental psychology and computer science with a specialization in human interface design.

Contact

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Network Research

Fields of Research

Research on communications/computer network technologies, at both the network design and network services levels. This research is directed at large-scale civilian and military networks, including international ATM networks and the Internet. Specific topics include the design of new services, the design of user interfaces, and the evaluation of network configurations and operations.

Contact

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Radio Broadcast Systems and Transmission Laboratory

Fields of Research

The laboratory conducts research and feasibility studies in new and advanced broadcast systems and services for terrestrial and satellite sound and data broadcasting to fixed, portable, and vehicular receivers.

The group carries out R&D in the following areas: new digital system concepts for better audio quality and service availability; new coverage concepts for spectrum and power efficiency; coverage prediction software for systems planning and optimization; and new sound and data broadcast services.

To carry out these research activities, the group has access to the following facilities: specialized workstations and sophisticated coverage prediction software, a digital radio broadcasting laboratory testbed, and an experimental radio broadcasting station. The testbed permits testing the performance of new equipment and interfaces under realistic conditions, including impairments such as interference and multipath.

The group also operates a minivan that is equipped for field tests of broadcast-receiving equipment and measurements of channel characteristics. Software tools have been developed for the analysis of the measured data and the generation of realistic channel models that can be used in simulation tests.

The group has been closely involved with the standardization activities and the implementation of digital radio broadcasting in Canada.

Contact

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Advanced Audio Systems Laboratory

Fields of Research

The laboratory conducts research and development especially related to the future introduction of digital radio broadcasting (DRB), sound systems accompanying advanced television (ATV), and sound coding schemes for eventual use on the information highway. The group carries out research in three main areas: digital audio source coding techniques for mono, stereo, and multi-channel sound systems; psychoacoustics and subjective assessment of sound systems; and channel coding and modulation techniques suitable for broadcasting digital audio signals to fixed, mobile, and portable receivers. To carry out these research activities, the group has unique facilities: a calibrated reference listening room that meets international standards; stereo and multichannel sound playback systems allowing totally seamless switching between audio excerpts for critical comparison; and general-purpose workstations and sophisticated computer simulation software for digital signal processing. The facilities and expertise for conducting audio research and listening tests are unique in North America.

Contact

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Advanced Video Systems

Fields of Research

The group conducts leading-edge research in video processing, source coding and human visual perception related to advanced television (ATV) systems, and new video and multimedia services. Research is carried out in the following main areas: digital video processing (format conversion), video compression, subjective assessment of picture quality, stereoscopic (3D) video (psychophysics and coding aspects) and High Definition Television (HDTV).

To support this research, the group has excellent facilities, including 3D capture and display, HDTV, a world-class subjective evaluation facility, extensive computer simulations facility and MPEG-2 encoding and streaming equipment.

Contact

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Television Systems and Transmission Laboratory

Fields of Research

The laboratory conducts research in coding and modulation alternatives for the transmission of wide-band analog and digital signals over off-air, cable, and satellite channels. The emphasis is on the transmission of digital advanced television signals. The laboratory is supported by excellent computer and hardware simulation facilities. Research is also carried out in the characterization of wide-band transmission channels.

Contact

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National Defence

Defence Research and Development Canada (DRDC)

Defence Research Establishment Atlantic (DREA)

DREA is the Department of National Defence centre of expertise for research and development in undersea warfare and marine vehicle technology supporting Canadian Navy and Maritime Air requirements. DREA also participates significantly in Maritime Command and Control efforts. R&D in the above areas are conducted in the form of theoretical studies, experimental data gathering, system concept demonstrators, and field validation trials. A portion of the work is carried out at the Dockyard Laboratory (Pacific), Esquimalt, British Columbia, and at the National Research Council's Institute for Aerospace Research in Ottawa.

Fields of Research

Undersea Warfare: Ocean environmental acoustics, acoustic sensor systems, electromagnetic sensor systems, underwater acoustic transducers, sonar signal processing, sonar information management, marine mine countermeasures, torpedo countermeasures, towed bodies, remotely operated and autonomous underwater vehicles, sonar performance assessment and sonar system concept demonstration.

Maritime Command and Control: Maritime tactical picture generation and presentation; decision support tools and technology demonstrators integrating the command and control efforts at other laboratories with DREA's own capabilities.

Naval Platforms: Platform noise; dynamics; propeller design, structures, and materials; and marine corrosion science.

Air Platforms: Structures, propulsion, non-destructive testing, energy sources, and economic maintenance.

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Defence Research Establishment Atlantic (DREA)
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Dartmouth, Nova Scotia
B2Y 3Z7

Defence Research Establishment Valcartier (DREV)

DREV's mission is to conduct applied defence research and development work in the fields of optronic systems, information systems and weapon systems.

Fields of Research

Optronics and micro-engineering including visible and infrared components, sensors and systems, signal, image and data processing, as well as target and background characteristics and intervening media; command and control using state-of-the-art technologies in artificial intelligence, data fusion, system architectures, human-machine interfaces and decision support; emergent energetic materials including rockets, rocket and gun propellants, energetic polymers insensitive munitions, and pyrotechnic and pyrophoric devices for countermeasures and self-protection; ordnance including projectiles and their flight mechanics and terminal effects, weapon system performance analysis, platform vulnerability and survivability, high strain rate characteristics of materials, and smart fusing for munitions.

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Defence Research Establishment Valcartier (DREV)
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Val Bélair, Quebec
G3J 1X5

Defence Research Establishment Ottawa (DREO)

The Defence Research Establishment Ottawa is the lead authority and centre of expertise for the exploitation of the electromagnetic spectrum to meet future Canadian Forces, departmental, and national needs.

Fields of Research

DREO's core technologies are: radar technology including navigation, synthetic aperture radar, radar counter-countermeasures, target classification, missile approach warning systems, multifunction radar, coastal surveillance radar, and target tracking; electronic warfare technology including radar and communications, electronic support measures, electronic countermeasures, and electromagnetic protection; space systems technology including space environment and electronics, space systems and simulators, and space data exploitation; communications technology including satellite communications, advanced communications networks, wireless communications, HF radar, speech coding, and antennas; and information operations technology, including network attack detection and analysis, information protection and assurance, and information exploitation.

Contact

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Defence Research Establishment Ottawa (DREO)
Department of National Defence
Ottawa, Ontario
K1A 0Z4

Defence and Civil Institute of Environmental Medicine (DCIEM)

DCIEM is Canada's centre of expertise for defence R&D in human performance and protection, human-systems integration and military operational medicine. Its mission is to enhance the effectiveness and ensure the health and safety of the human in any human-machine system or adverse environment.

Fields of Research

DCIEM conducts R&D in the following areas: cognitive and behavioural sciences; information and decision systems; human factors engineering; simulation and training technologies; human-computer interaction; human systems modelling; sleep and circadian rhythms; aerospace and hyperbaric life sciences; life support systems; protective clothing systems; thermal and exercise physiology; trauma immunology; liposome technology; biomedical engineering.

Contact

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Defence and Civil Institute of
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Toronto, Ontario
M3M 3B9

Defence Research Establishment Suffield (DRES)

DRES is Canada's centre of expertise for defence R&D to counter chemical, biological, and explosive threats.

Fields of Research

Toxicology and Pharmacology: Toxicity and mechanisms of action of toxic chemicals (including chemical warfare agents), including pathophysiology. Prophylaxis and therapy for nerve agents, vesicants, and neurotoxins. Prevention and Treatment of Disease: Infectious disease mitigation, including vaccines and alternatives to vaccines such as protective/therapeutic antibodies and immune modulators. Anti-infective drugs and drug delivery systems, including inhalation and liposome encapsulation. Threat Assessment and Consequence Management: Development of computer models for hazard assessment, including hazardous cloud movements. Detection, Diagnostics and Protection: Detection and identification of chemical and biological hazards by various methods including: spectrometric particle counting/sizing, ionization, capillary electrophoresis, microfluidics, immunochemistry, and gene probe technology. Personal protection equipment in hostile chemical environments and techniques to decontaminate persons and equipment. Military Engineering: Explosive physics in air and under water, explosively formed projectiles, fuel-air explosives, numerical methods in fluid dynamics, blast and shock wave/structure interactions, detection and identification of buried landmines, ordnance, and minefields. Autonomous, Intelligent Systems: Tele-operated and robotic surface vehicles and their control for military applications; land vehicle dynamics and advanced vehicle subsystems; image analysis and artificial intelligence.

Contact

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Defence Research Establishment Suffield
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Medicine Hat, Alberta
T1A 8K6

Operational Research Division

The Operational Research Division provides and maintains expert, objective, and responsive analytical services based on the scientific method, which contribute to improved operational effectiveness and efficiency for the Canadian Forces and Department of National Defence now and in the future.

Fields of Research

Computer simulations and models of engagements in anti-submarine warfare and maritime air defence. Campaign models of effectiveness of escorts and maritime patrol aircraft; mathematical modelling, simulation and war-gaming of land forces equipment, structures, and tactics. Tactical air defence, aerospace defence, air transport, and search and rescue operations. Studies of factors affecting the employment of land force electronic warfare techniques and systems. Development and evaluation of decision support systems for optimal sparing, supply and transportation, life-cycle costing, and materiel management. Development of systems to support manpower management, training, mobilization, planning, and policy formulation. Studies on combat motivation, social and military family support mechanisms. Applications in numerical analysis, applied statistics, probability theory, artificial intelligence, and the design and conduct of field trials.

Contact

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Operational Research Division
Department of National Defence
Ottawa, Ontario
K1A 0K2

Personnel Research Team

The Personnel Research Team conducts applied behavioural science research in support of Canadian Forces operations.

Fields of Research

Social Demographics Section: Research and program development related to gender integration, employment equity, the Northern Native Entry Program, Defence Ethics Program, SHARP, and Culture Team initiatives. Review developments in the academic literature of models related to social change initiatives in order to develop frameworks for integrating Department of National Defence social policy programs and requirements. Integrate individual research projects into a coherent approach to diversity so as to optimize research efforts and best address the diversity needs of the Defence team.

Selection and Assessment Section: Review Canadian Forces (CF) selection programs and initiatives related to the use of competency assessment and performance appraisal. Examine recent developments in the academic literature regarding the development of competency-based assessment techniques to identify the optimum approach for the CF with particular attention to human rights implications. Integrate individual research projects into a coherent approach to competency assessments so as to optimize research efforts and best address Force generation requirements.

Contact

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Personnel Research Team
Department of National Defence
Ottawa, Canada
K1A 0K2

Royal Military College of Canada

The mission of the Division of Graduate Studies and Research is to provide advanced degree programs and professional development for postgraduate students in key areas of engineering, humanities, and science in support of the Canadian Forces (CF), to carry out research at the level needed to sustain the teaching programs, and to support the CF mandate through its Defence Research Establishments (DREs), Engineering Classifications, and Operational Commands.

Fields of Research

Chemistry and Chemical Engineering: Engineering materials to include polymers, biomaterials, ceramics, inorganics, organometallics, metals and alloys, carbon and metals as adsorbents for gas storage and air purification; catalyst studies applied to fuel cells and hydrogen production for air-independent power; electrochemical power sources to include fuel cells and batteries; corrosion studies; environmental studies to include site assessment for contamination, analytical methods, trace analyses, instrument development, destruction of hazardous wastes, soil cleanup, site remediation; nuclear studies to include radiation decontamination, radiation fields at aircraft altitudes, radiation processing of polymers, behaviour modelling of released fission products, techniques of neutron radiography; photochemistry and photobiology of light-sensitive agents to destroy cancer cells; knowledge-based diagnostic and maintenance systems.

Mathematics and Computer Science: Analysis, invariant theory, combinatorics, multiple-value logics, statistics, mathematical physics, operational research, artificial intelligence, database, command and control.

Physics: Electromagnetism, optical imaging, Mossbauer spectroscopy, radio astronomy, particle physics, oceanography, non-destructive evaluation, acoustical sensors, opto-electronics, high-temperature superconductors, photoacoustics, multispectral imaging, nuclear waste analysis, explosion modelling.

Civil Engineering: Fibre-reinforced plastics for repair and new structures, connections in timber, seismic design of masonry structures, ship's connections, behaviour of lattice structures, geosynthetics for seismic design of soil structures, particle mechanics, pavement on compressible soils, environmental engineering in the Arctic, environmental impact assessment, toxic waste and water resources management, subsurface contaminant transport and site remediation, bituminous materials in northern pavement construction, interlocking concrete block pavements, optimization of signalized intersections, development of knowledge-based systems, ground-surveying techniques GPS and GIS.

Computing and Electrical Engineering: Digital systems using advanced IC technologies; security fault analysis; radar studies, microwave engineering, antennae, radio propagation and applied electromagnetics; power switching transient, radar cross-section investigation; computer communication networks and switching technologies; communication systems and coding; neural networks and fuzzy logic; algorithms and schemes for detection, target classification; new techniques for satellite communication systems; harmonic analysis in distribution systems and aircraft power systems; registration algorithms for North Warning Radar Systems, application of non-conventional techniques to sonar data association, development of multi-robot work cells; development of an ATC collision prediction display, object-oriented technology, distributed computing and information security.

Mechanical Engineering: Combustion studies, non-metallic and metallic concepts, computer applications, electro-optics, turbo-machinery, engineering education, propane tank explosions, robotics, fundamental mechanics.

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National Research Council of Canada

Biotechnology Research Institute (BRI)

The Biotechnology Research Institute was established by the National Research Council of Canada to foster R&D in areas of research of greatest relevance to Canadian industry, and to develop new products and processes. BRI emphasizes generic research and technology transfer to industry and promotes communication and collaboration amongst industrial, university, federal, and provincial government laboratories.

The permanent objectives of the Institute are:

- to carry out R&D in areas chosen, in consultation with industry and public organizations, as being the most important to Canada's economic development;
- to invest, in cooperation with Canadian industry, in fields where private sector financing alone of research activities could not be justified;
- to promote R&D in industries where biotechnological products and processes offer better substitutes;
- to actuate the transfer of results and discoveries in biotechnology to Canadian firms; and
- to foster joint research projects with industry, universities, and other research institutes.

Fields of Research

Pharmaceutical and environmental biotechnologies: animal cells engineering, eucaryotic cell genetics, mammalian cell genetics, protein chemistry, cell surface recognition, enzyme engineering, biomolecular interactions, macromolecular structure, biosensors, environmental engineering, environmental analytical chemistry, environmental genetics, applied environmental microbiology, applied ecotoxicology, bioprocess.

Web site: www.nrc.ca/bri

Contact

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Biotechnology Research Institute
National Research Council of Canada
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Herzberg Institute of Astrophysics (HIA)

HIA is part of the National Research Council (NRC) and is responsible for operating all of Canada's national observatories in astronomy and for providing access to these to the Canadian scientific community. HIA's own facilities include the Dominion Astrophysical Observatory near Victoria, British Columbia, and the Dominion Radio Astrophysical Observatory near Penticton, British Columbia. HIA is a partner in several international consortia operating major observatories overseas (in Hawaii and Chile), including the Canada-France-Hawaii Telescope, the James Clerk Maxwell radio telescope and the two new Gemini optical/infrared telescopes. HIA also operates the Canadian Astronomical Data Centre (CADC) in Victoria.

As well as carrying out astrophysical research, HIA develops advanced instrumentation for its telescopes and also software for collecting and analyzing data. This technology development work is carried out in partnership with Canadian industry and universities, the Canadian Space Agency, and HIA's international partners in the United States and Europe.

Web site: www.nrc.ca/hia

Fields of Research

Optical astronomy, optical instrumentation, detectors, radio astronomy, radio instrumentation, image processing, data archiving, control systems.

Contacts

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Institute for Marine Biosciences (IMB)

IMB is dedicated to research and development in fish health and nutrition, marine toxins and genomic technologies.

At IMB, our main research goals are:

- to understand the fundamentals of host-pathogen interactions and the ontogeny of the immunological and digestive systems of marine animals, and to identify specific targets for vaccine, therapeutant, and immunomodulator development;
- to maintain a high level of preparedness in order to respond effectively to toxic algal incidents. To extend our expertise and research to the Certified Reference Materials Program (CRMP) to develop and market certified standards and reference materials to assist analysts around the world;
- to develop strategies and biotechnologies for the enhanced aquaculture production of established and novel finfish, shellfish, and marine plants of commercial importance. Emphasis is on nutrition, diet development, health, early ontogeny, and stress responses; and
- to develop improved protein characterization techniques, with emphasis on protein mass spectrometry, micro-fabricated devices for sample handling, improved protein separation technologies and methods for gene expression analysis.

Fields of Research

A. Marine Sciences

- Fish health, focusing on host-pathogen interactions
- Fish nutrition
- Fish biology and physiology, focusing on alternative marine species for aquaculture
- Shellfish health and nutrition
- Marine toxins, focusing on metabolic pathways of toxic phytoplankton, and development of analytical chemistry methods for toxin identification and detection
- Certified Reference Materials Program, focusing on production of certified marine toxin standards and reference materials

B. Genome Sciences

Research on developing technologies in proteomics, genomics, DNA sequencing bioinformatics and imaging. To establish a broad-spectrum but integrated genome science capability that includes bioinformatics, high-throughput DNA sequencing, proteomics, and advanced imaging techniques.

Facilities and Equipment

- High-throughput DNA sequencing lab
- Canadian Bioinformatics Resource
- Real-time polymerase chain reaction (PCR)
- Gene Matcher
- Molecular biology
- Tissue culture facilities
- Mass spectrometers
- Certified Good Laboratory Practice (GLP) lab
- Nuclear magnetic resonance (NMR)
- Analytical chemistry
- Proteomics clean room

- Marine aquaculture facility
- Industrial pilot-scale feed mill
- Transmission electron microscope
- Scanning electron microscope
- Integrated histology and imaging facility

Web site: www.nrc.ca/imb

Contact

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Institute for Marine Biosciences
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Industrial Materials Institute (IMI)

The mission of the Industrial Materials Institute is to promote innovation and economic growth through research and development activities related to materials processing technologies, by means of partnerships.

Web site: www.nrc.ca/imi

Fields of Research

The IMI is recognized as a leader for its multidisciplinary scientific and technological expertise in materials design and process engineering for forming and performance optimization; modelling technologies, 3D presentation and diagnosis; data integration and state-of-the-art digital process control systems. R&D activities involve metals, polymers, ceramics and their composites and alloys. The IMI's expertise involves the aerospace, automobile, and biomedical industries, as well as the industrial technology sectors for manufacturing specialists, suppliers of instruments and equipment, and software engineering services.

The IMI works in close cooperation with industry, universities, and governments, through the creation of special interest groups, consortia, and joint research projects. The IMI also promotes numerous start-up companies that develop new technologies for the optimization of materials, products, and services that will build tomorrow's economy. Each year the Institute participates in and organizes major conferences and welcomes many scientists and visitors from across Canada and around the world.

Contact

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75 de Mortagne Boulevard
Boucherville, Quebec
J4B 6Y4

Institute for Aerospace Research (IAR)

As the principal national aerospace research centre, the Institute for Aerospace Research will undertake, assist, and promote research and development in support of the Canadian aerospace community, adding value to the design, manufacture, performance, use, and safety of aerospace vehicles.

Fields of Research

Research on the design, strength, stability, durability, performance, efficiency, and safety of aerospace structures and their subsystems; studies on structural materials, components, design details, and built-up structures, involving their response to simulated aerodynamic, acoustic, and mechanical excitation; studies in wind engineering. Research on aeropropulsion focusing on life extension and engine health monitoring. Aerodynamics activities cover subsonic, transonic, and supersonic flow; and new aircraft concepts and advanced aeronautical systems. Flight mechanics and avionics research in areas such as helicopter

handling quantities, flight test techniques, aircraft modelling and simulation, advanced cockpit technologies, and modern guidance and navigation; airborne research experimentation including atmospheric and biospheric studies, aeromagnetics and aerogravimetry. Development of numerical and analytical techniques for all of the above.

Web site: www.nrc.ca/iar

Contact

Dr. W. (Bill) Wallace
Director General
Tel.: (613) 993-0141
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Institute for Aerospace Research
National Research Council of Canada
Montreal Road, Bldg M-3
Ottawa, Ontario
K1A 0R6

Institute for Biological Sciences (IBS)

The Institute for Biological Sciences will do innovative research in neurobiology and immunochemistry of importance to the health and pharmaceutical sectors. The Institute will form strong partnerships with industry and other R&D organizations to generate wealth in Canada and improve the quality of life for Canadians through science and technology.

Fields of Research

Cell biology and neurophysiology related to neurodegenerative diseases; role of signalling enzymes, ions and ion channels, neurotransmitter receptors, non-neuronal cells of the CNS, blood-brain barrier, apoptosis, neuroplasticity, cell technology for tissue regeneration; in vivo and in vitro models of disease. Immunochemistry of carbohydrate and peptide antigens and receptors, antibody engineering; structure determination of antigens and receptors, oligosaccharide synthesis; polysaccharide modification, conjugate vaccines; antigen presentation; bacterial pathogenesis; therapeutics based on cell adhesion, carbohydrate processing enzymes.

Web site: www.nrc.ca/ibs

Contact

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Director General
Tel.: (613) 993-7506

Institute for Biological Sciences
National Research Council of Canada
Ottawa, Ontario
K1A 0R6

Institute for Chemical Process and Environmental Technology (ICPET)

The mission of ICPET is to develop chemical process technology, know-how, and information valuable to clients in the Canadian manufacturing industries for improving the commercial viability of their products, processes, and operations while at the same time helping them to meet their environmental responsibilities.

Fields of Research

Process Technology Program: This program targets cost-effective and environmentally benign process technologies for chemical process-intensive industries. The goal is to reduce manufacturing costs through improved efficiency while recognizing the issues of clean manufacturing and systems closure.

Building on expertise in multiphase and particulate systems, colloid, interfacial, and electrochemistry, and on materials and process aspects of separations, novel processes and devices will be developed that are relevant to a broad range of industry sectors including non-traditional chemical process-intensive industries.

Chemical Systems and Materials Program: In this program, expertise in synthesis, chemical modification, and evaluation of materials, based upon inorganic and polymer chemistry, will target the development of function-specific and/or performance-enhanced materials. Competencies in chemical reaction systems, coupled with the adaptation and integration of computation and information technologies, will provide advanced tools for chemical process design, monitoring, and control and for improved management of environmental implications. These competencies will be maintained through a strong, yet flexible, applications research orientation linked to the materials and process development focus of the Institute.

Web site: www.nrc.ca/icpet

Contact

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Institute for Chemical Process and
Environmental Technology
National Research Council of Canada
Montreal Road, Bldg M-12
Ottawa, Ontario
K1A 0R6

Institute for Information Technology (IIT)

The NRC Institute for Information Technology is dedicated to research and development in software and systems technologies. IIT's mission is to assist industry through collaborative research and development projects. The Institute works with companies individually and in groups, with product developers and lead users, with firms both large and small.

Fields of Research

Intelligent advisors; machine learning and information retrieval and filtering; interaction with modelled environments; seamless computing, communication and networking; software engineering, real-time and embedded systems, commercial software products, and large-scale systems; 3-D vision sensor technology, 3-D digital imaging and advanced modelling.

Web site: www.nrc.ca/iit

Contact

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Director General
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Institute for Information Technology
National Research Council of Canada
Montreal Road, Bldg M-50
Ottawa, Ontario
K1A 0R6

Institute for Marine Dynamics (IMD)

The Institute enhances Canada's competitiveness by providing innovative solutions and technical expertise in ocean engineering. It collaborates with industry, the academic community, and government to anticipate and respond to challenges and opportunities to improve industry's capacity to generate wealth.

Fields of Research

Offshore platform and ship motion characteristics, vessel stability, small craft powering and stability, underwater vehicle technology, wave loading on structures, ice forces on vessels and structures, ice material properties, offshore production systems, computational hydrodynamics and simulation, dynamic positioning systems, vessel manoeuvring, marine navigation technology, yacht design evaluation.

Web site: www.nrc.ca/imd

Contacts

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Director General
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David Frew
Human Resources Generalist
Tel.: (709) 772-2461

Institute for Marine Dynamics
National Research Council of Canada
Kerwin Place
P.O. Box 12093, Station A
St. John's, Newfoundland
A1B 3T5

Integrated Manufacturing Technologies Institute (IMTI)

IMTI conducts research in engineering and sciences, with an overall orientation toward integrated manufacturing technologies.

IMTI's expertise is divided into two major complementary areas: Systems Simulation and Control Research and Production Technology Research.

Systems Simulation and Control Research focuses on the development of tools and technologies to assist Canadian manufacturers, their clients, and suppliers in the areas of concurrent engineering, distributed manufacturing, and modelling and visualization.

This complete collaboration, from the beginning to the end of a project, to develop a product or equipment is based upon the ability to re-engineer the design and manufacturing processes, share information, and validate the concept in a virtual or digital environment.

Production Technologies Research focuses on laser-based manufacturing. Several methods of freeform manufacturing are being developed at the institute: material addition processes, precision fabrication processes, and shape transfer processes.

Manufacturers constantly seek to increase the versatility and productivity of their manufacturing processes. The use of materials that are difficult or impossible to manufacture using conventional processes can confer a competitive advantage. As lasers are highly controllable devices, the research creates opportunities to develop new manufacturing processes, machines, and systems that incorporate lasers and rapid tooling processes.

Web site: www.nrc.ca/imti

Contact

Georges Salloum
Director General
Tel.: (519) 430-7078

Integrated Manufacturing Technologies Institute
National Research Council of Canada
800 Collip Circle
London, Ontario
N6G 4X8

Institute for Microstructural Sciences (IMS)

The mission of IMS is to provide leadership, in collaboration with Canadian industry, in the development of the strategic base for information technology, that is, in the development of enabling technologies related to future hardware requirements for information processing, transmission, and storage.

Fields of Research

Compound semiconductors, molecular beam epitaxy, microfabrication, advanced electronic and optoelectronic devices, semiconductor characterization, nanotechnology, matter theory, advanced epitaxial techniques.

Web site: www.nrc.ca/ims

Contact

Dr. P.H. Dawson
Director General
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Institute for Microstructural Sciences
National Research Council of Canada
Montreal Road, Bldg M-50
Ottawa, Ontario
K1A 0R6

Institute for Research in Construction (IRC)

NRC's Institute for Research in Construction is the internationally recognized centre of excellence in research areas critical to the Canadian construction industry.

IRC provides leading technologies, timely solutions, model codes, and evaluation services in support of Canada's industrial competitiveness, infrastructure, and public safety, through an integrated, multidisciplinary team of highly motivated, market-responsive people working in partnership with the public and private sectors.

IRC will be known to its clients and stakeholders for its relevance, objectivity, and excellence.

The goals of IRC are to:

- excel in research and development areas critical to Canadian construction needs;
- be a gateway for construction technology nationally and internationally;
- provide an objective link between innovation and application;
- support the development of a nationally accepted codes system, which encourages innovation; and
- create a fulfilling workplace conducive to creativity and innovation.

Fields of Research

The Institute has divided its research activities into four program or service areas:

Fire Risk Management Program: Systematically integrates fire modelling and experimental competencies with specific expertise in fire resistance, fire detection and suppression, smoke movement, fire development, human factors, and fire risk assessment to develop methodologies and technologies that will save lives and reduce the total cost of fire in Canada.

Building Envelope & Structure Program: Develops technologies for design, construction and operation of cost-effective building systems. The research combines asset management concepts with multi-discipline measurement and modelling of physical performance. Projects on evaluating, repairing and protecting structures apply the combination of materials science and structural engineering to resolve key concerns for Canada's existing buildings. Building Envelope projects focus on wall, roof, and window systems that are energy-efficient and durable, expanding from a traditional emphasis on long-term performance in cold climates, to encompass evaluation for conditions in key export markets.

Indoor Environment Program: Provides technologies to design and operate indoor environments that maximize the comfort, productivity, health, and safety of building occupants. The program integrates experimental and analytical competencies in the areas of lighting, acoustics, ventilation, air movement, indoor air quality, thermal comfort, and occupant reactions to their environments.

Urban Infrastructure Rehabilitation Program: Produces cost-effective solutions to municipal infrastructure problems through the development of technologies for the design, repair and maintenance of buried services, urban roads and surface structures including bridges. Repair strategies are based on life-cycle costs.

Web site: www.nrc.ca/irc

Contact

Dr. Sherif Barakat
Director General
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Institute for Research in Construction
National Research Council of Canada
Montreal Road, Bldg M-20
Ottawa, Ontario
K1A 0R6

Steacie Institute for Molecular Sciences (SIMS)

The Steacie Institute's mission is long-term research in selected areas of molecular science. Its emphasis is on creativity and interdisciplinary work. The field is an important and thriving one that is of tremendous relevance to the highly dynamic sectors of Canada's economy and one in which NRC has a long and distinguished tradition.

Fields of Research

Femtosecond science, nanoscale materials and processes, supramolecular chemistry and biology, theory, spectroscopy.

Web site: www.nrc.ca/sims

Laboratories located in Ottawa

Contacts

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Program Leader
Nanoscale Materials and Processes Program
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Dr. Willem Siebrand
Program Leader
Theory Program
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Dr. Robert McKellar
Program Leader
Spectroscopy Program
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Steacie Institute for Molecular Sciences
National Research Council of Canada
100 Sussex Drive
Ottawa, Ontario
K1A 0R6

Institute for Biodiagnostics (IBD)

Fields of Research

Multidisciplinary research into techniques and instrumentation for improved diagnosis of disease and monitoring of therapy in humans. Research activities include: design and construction of specialized instruments for magnetic resonance imaging and spectroscopy; use of spectroscopic methods to investigate the molecular basis of disease; creation of sophisticated computational techniques for analysis of biomedical data; application of advanced techniques and instrumentation to problems of medical concern, including cancer, stroke, and heart research.

Web site: www.nrc.ca/ibd

Contact

Dr. I.C.P. Smith
Director General
Tel.: (204) 983-7526

Institute for Biodiagnostics
National Research Council of Canada
435 Ellice Avenue
Winnipeg, Manitoba
R3B 1Y6

Centre for Surface Transportation Technology (CSST)

Fields of Research

Highway Vehicles, Railway Vehicles, Pavements Laboratory

Web site: www.nrc.ca/cstt

Contacts

Mr. J. Coleman
Director General
Tel.: (613) 998-9638
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Dr. J.H.L. Palmer
Pavements Laboratory
Tel.: (613) 993-3787

National Research Council of Canada
Uplands Complex
Alert Road, Bldg U-89
Ottawa, Ontario
K1A 0R6

Institute for National Measurement Standards (INMS)

Fields of research

Research, development, and dissemination of standards of acoustics, length, mass, time and frequency, thermometry, photometry and radio-metry, and ionizing radiation, and of electricity including power measurements.

Web site: www.nrc.ca/inms

Contact

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Director General
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Institute for National Measurement Standards
National Research Council of Canada
Montreal Road, Bldg M-36
Ottawa, Ontario
K1A 0R6

Plant Biotechnology Institute (PBI)

Fields of Research

Plant cell technology; cereal grain biotechnology; biotechnology for oilseed crops; conifer biotechnology; plant molecular genetics; plant gene technology; molecular biology of plant stress resistance; plant genetic engineering; transgenic species; genes for plant productivity; biological chemistry; bio-organic chemistry.

Web site: www.nrc.ca/pbi

Contact

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Plant Biotechnology Institute
National Research Council of Canada
110 Gymnasium Place
Saskatoon, Saskatchewan
S7N 0W9

NSERC CRSNG Program Guide

Natural Resources Canada

Natural Resources Canada (NRCan) is a federal government department specializing in the sustainable development and use of natural resources, energy, minerals and metals, forests and earth sciences. At NRCan, we deal with natural resource issues that are important to Canadians. We look at these issues from both a national and international perspective, using our expertise in science and technology, policy, and programs. How we manage our land and resources today will determine the quality of life for Canadians both now and in the future.

NRCan provides four main services to Canadians:

- We conduct leading-edge science and technology research to provide Canadians with ideas, knowledge, and technologies. This helps Canadians use their country's resources wisely, reduce costs, protect the environment, and create new products and services.
- We build and maintain a national knowledge infrastructure on Canada's land and resources, so all Canadians can easily access the latest economic, environmental, and scientific information.
- We ensure that federal policies and regulations on issues such as the environment, trade, the economy, Canadian land, and science and technology enhance the natural resources sector's contribution to the economy. At the same time, we make sure these policies and regulations protect the environment and the health and safety of Canadians.
- Together with international agencies and other nations, we promote Canada's international interests. This helps Canada meet its commitments related to natural resources and keeps access open to global markets for Canadian products, services, and technology.

Web site: www.NRCan-RNCan.gc.ca

Minerals and Metals Sector

Mining and Mineral Sciences Laboratory – Bells Corners

Fields of Research

Ground control, mine support systems, rock property testing, health and safety in underground mines, numerical modelling, instrumentation development.

Contact

Jim Vance
Program Manager
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E-mail: jvance@nrcan.gc.ca

Mining and Mineral Sciences Laboratory
Bells Corners, Ontario
K1A 0G1

Mining and Mineral Sciences Laboratory – Ottawa

Fields of Research

Mineral processing, applied mineralogy, analytical chemistry, biotechnology, acid mine drainage, effluent treatment, recycling of mineral wastes, tailings and waste disposal, mine site decommissioning, geomatic information systems, aquatic toxicology, process engineering.

Contact

Roy Sage
Director
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Fax: (613) 992-8928
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Mining and Mineral Sciences Laboratory
555 Booth Street
Ottawa, Ontario
K1A 0G1

Mining and Mineral Sciences Laboratory – Sudbury

Fields of Research

Rock burst, rock mechanics, ground support systems-backfill technology, backfill properties, mine ventilation, underground mine atmosphere surveys.

Contact

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Program Manager
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Mining and Mineral Sciences Laboratory
1079 Kelly Lake Road
Sudbury, Ontario
P3E 5P5

Mining and Mineral Sciences Laboratory – Val d'Or Experimental Mine

Fields of Research

Equipment development and testing, mine automation and robotics, design of electro-hydraulic systems, instrumentation development, non-explosive rock fragmentation, inspection of mine hoisting equipment, seismology.

Contact

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Mining and Mineral Sciences Laboratory
1 Peter Ferderber Road
P.O. Box 1300
Val d'Or, Quebec
J9P 4P8

Materials Technology Laboratory – Ottawa

The Materials Technology Laboratory (MTL) is the largest research facility in Canada dedicated to metals, ceramics and concrete technology. It is a highly effective, client-driven operation, offering start-to-finish capabilities from materials selection, fabrication and characterization to prototype product fabrication.

MTL also houses:

- The Certifying Agency for Nondestructive Testing, Canada's national organization for the certification of NDT personnel.
- The International Centre for the Sustainable Development of Cement and Concrete Industry (ICON), Canada's leading research centre in cement and concrete technology promoting the transfer worldwide of technology on the use of supplementary cementing materials.

Expertise and Facilities

Materials Selection

- Advanced materials and fabrication processes

Materials Fabrication

- Experimental casting laboratory
- Experimental forming laboratory
- Tailored joining processes

In-Service Performance

- Corrosion testing
- Engineering performance
- Property Evaluation
- Physical property evaluation
- Mechanical property evaluation
- Coatings evaluation
- Microstructural characterization
- Nondestructive testing

MTL has five technical programs. The major objectives of these programs are outlined below.

Sustainable Casting

Provide technology to support the Canadian foundry industry. Reduce the environmental impact of foundry operations. Identify and develop more efficient and effective aluminum casting procedures for the automotive industry.

Energy-Efficient Metal Production

Optimize steel casting yield and quality. Develop more energy-efficient metal processing technology. Develop technology to control residuals in electric arc steelmaking to improve yield. Develop computer-based systems to optimize product quality and process efficiency.

Advanced Materials Technologies

Raise industry awareness of the advantages of using advanced materials and processes. Develop advanced materials technologies for small and medium-sized enterprises. Develop technologies to reduce energy consumption and greenhouse emissions in the transportation industry.

Infrastructure Reliability

Ensure the continued reliability for service of Canadian oil and gas pipelines, marine offshore structures and ships, pressure vessels, and power generation plants, thereby ensuring public safety and environmental protection. Enhance the economic position, security of supply of Canadian energy resources. Maximize benefits to the economy from fabrication and service of steel structures.

Advanced Concrete

Develop technology to enhance the durability and performance of concrete. Develop technology to mitigate the effects of alkali-aggregate reactivity. Develop technology to further the use of supplementary cementing materials.

Contact

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Materials Technology Laboratory
568 Booth Street
Ottawa, Ontario
K1A 0G1

Energy Sector

CANMET Western Research Centre

Fields of Research

The CANMET Western Research Centre (CWRC) consists of two laboratories: Advanced Separation Technologies (AST) and the National Centre for Upgrading Technology (NCUT), which is a joint venture between the Government of Canada and the Government of Alberta.

AST conducts research in: oil sand processing technologies and related environmental issues, corrosion control in Canada's pipeline infrastructure, and oil/water/solids separation technologies. AST delivers fundamental and applied research for the petroleum and environmental industries, with particular emphasis on in-situ and surface-mined oil sands bitumen and heavy oil.

NCUT conducts research in: primary and secondary upgrading technologies development of breakthrough technologies or incremental improvements leading to enhanced energy efficiency and environmental performance; emissions reduction in bitumen and heavy oil processing plants, evaluation of hydrocracking and hydrotreating catalysts for upgraders, refiners and catalyst manufacturers, and the fundamentals of coking and fouling mechanisms in upgrading and refinery units.

CWRC facilities include varied laboratory and pilot facilities for evaluation, testing and development of oil sand/bitumen and heavy oil extraction, froth treatment and upgrading processes. State-of-the-art analytical laboratories provide support to bench and pilot-scale work. Research is often conducted in the field at industry sites.

Staff consists of multidisciplinary teams of scientists and engineers focused on solving industry problems. Projects are team-based, and many involve client partners.

Contact

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Director
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Web site: www.canmet-wrc.com

CANMET Western Research Centre
1 Oil Patch Drive, Suite A202
Devon (Edmonton), Alberta
T9G 1A8

CANMET Energy Technology Centre (CETC)

CANMET Energy Technology Centre (CETC), one of the key science and technology arms of Natural Resources Canada, is involved in exploratory and incremental research, development, and demonstration in the fields of alternative, conventional, and renewable energy technologies with Canadian energy and R&D sectors to increase energy efficiency and promote sustainable development.

Areas of expertise include:

- energy-efficient technologies for industry and for residential and commercial buildings;
- renewable energy (e.g., solar, bioenergy, wind, small hydro);
- alternative transportation fuels (e.g., natural gas, propane, hydrogen, alcohols, bio-diesels);
- community energy systems (e.g., district heating and cooling, combined heat and power, biomass);
- clean, efficient combustion of all fuels (fossil, wastes, biomass);
- metallurgical coal and coke;
- efficient processing and conversion of hydrocarbons (e.g., natural gas, waste petroleum and vegetable oils) including catalyst and membrane reactor development;
- CO_2 management (e.g., CO^2 capture and storage); and
- transportation systems (e.g., fuel cells, electrical vehicles, and flywheels).

CETC has world-class research facilities, including ISO 9002 certified laboratories for advanced combustion, chemical processing and development, metallurgical fuels and fuels characterization. This is complemented by a number of cost-shared programs to assist industry and other key stakeholders in developing new energy technologies. CETC employs approximately 180 people who are seasoned high-tech professionals and innovators in their fields. Our staff is able to provide technical support and,

where required, laboratory services at every stage of the technology development cycle, from feasibility studies and basic R&D, to field testing and incremental technology improvements, to market studies and evaluation services.

Programs and Services at a Glance

The **Advanced Combustion Technologies** group uses laboratory facilities to support the development of novel combustion and pollution abatement technologies. Our work is aimed at reducing emissions of acid rain precursors, greenhouse gases, particulates, and identified priority substances like trace elements and organic substances, with a particular emphasis on CO_2 management strategies.

The **Buildings Energy Technologies Program** uses cost-sharing arrangements and partnerships between technology suppliers and end users to develop a new generation of technologies that improve energy efficiency, indoor air quality, durability, and comfort while facilitating the environmentally responsible design, construction, operation, and renovation of energy-efficient buildings.

Experts at the **Characterization Laboratory** characterize gaseous, liquid, and solid products and by-products derived from the processing/combustion of fossil, biomass, and waste fuels, often adapting specialized techniques to meet clients' needs. Work is also ongoing to develop novel analytical procedures and improve nationally and internationally recognized test methods.

The **Community Energy Systems** group helps communities meet their energy needs. The group identifies and develops opportunities for the use of district heating and cooling, combined heat and power (co-generation), waste heat recovery, thermal storage, and local sources of renewable energy, especially biomass.

The **Energy Technologies for High-Temperature Processes** group strives to improve coke-making and iron-making processes. Activities include researching coal injection into blast furnaces, extending the life of coke ovens, and improving the quality of coke.

The **Federal Industrial Boiler Program** offers advice and project management services to owners and operators of heating and cooling systems in federal and other buildings regarding equipment maintenance, selection, and installation. These activities help increase the energy efficiency, reduce NOx emissions, and extend the useful life of systems.

The **Industry Energy Research and Development Program** supports industry proposals for the development and initial application of leading-edge, energy-efficient and environmentally responsible processes, products, systems, and equipment.

The **Processing and Environmental Catalysis** group uses its core competency in process modelling, catalysis, and membrane development to solve industrial process problems and to research selected chemical conversion processes for natural gas, biomass-derived oils, waste treatment, and engine emissions.

The **Renewable Energy Technologies Program** supports Canadian industry's efforts to develop and deploy cost-effective and environmentally responsible renewable energy technologies, including small hydro, active solar, wind energy, and bioenergy technologies.

The **Transportation Energy Technologies Program** works in partnership with industry to support leading-edge transportation technologies that minimize environmental impacts. Program areas include alternative fuels and advanced zero emission propulsion systems, advanced energy storage systems, emissions control technologies, vehicle transportation systems efficiency, and fueling infrastructure.

Web site: www.cetc-ctec.gc.ca

Contact

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CANMET Energy Technology Centre
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CANMET Energy Technology Centre
Natural Resources Canada
1 Haanel Drive
Ottawa, Ontario

K1A 1M1

CANMET Energy Diversification Research Laboratory (CEDRL)

The CANMET Energy Diversification Research Laboratory (CEDRL) carries out applied R&D and technology transfer in the fields of energy efficiency and renewable energy.

CEDRL's mandate is to assist clients in enhancing their domestic and international competitiveness by performing applied research; to support government policy development, initiatives, and programs by providing scientific knowledge and advice; to improve the knowledge base needed to achieve Canada's long-term goals in energy efficiency and renewable energy technologies by performing exploratory research; and to reduce energy costs and deploy novel technologies.

Fields of Research

Advanced heat pumps; heat recovery and transfer; cooling and dehumidification through absorption/adsorption/desiccants; thermal energy management and control; detection and diagnosis of HAVC system faults; optimization of industrial thermal processes; thermal control for space systems and spacecrafts.

Industrial thermal treatments; waste treatment; recycling control of polluting emissions; materials for combustion and storage of natural gas.

Technico-economic studies; design and demonstration of solar photovoltaic energy (PV) systems; thin-film technology for the manufacture of PC cells; characterization and modelling of PV components and systems; design and installation standards and manuals.

Contact

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CANMET Energy Diversification
Research Laboratory
1615 Lionel-Boulet Blvd
P.O. Box 4800
Varennes, Quebec
J3X 1S6

Earth Sciences Sector

Geological Survey of Canada (GSC)

GSC Atlantic

Fields of Research

Geology and geophysics of continental margins of eastern and Arctic Canada and contiguous ocean basins including deep seismic studies and geodynamic modelling, petroleum geology, surficial and environmental marine geology including geotechnical research, marine geoscience technology, development of sedimentary basins, seabed stability, biostratigraphy, and appropriate databases.

Contact

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Director
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Geological Survey of Canada (Atlantic)
P.O. Box 1006
Dartmouth, Nova Scotia

B2Y 4A2

GSC Calgary

Fields of Research

Geology, geophysics and geochemistry of the sedimentary basins and orogens in western and Arctic Canada (including sedimentology, paleontology, stratigraphy and structural geology), organic geochemistry, coal and petroleum geology, and national assessments of hydrocarbon resources.

Contact

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Geological Survey of Canada (Calgary)
3303 – 33 Street NW
Calgary, Alberta
T2L 2A7

GSC Pacific

Fields of Research

Sidney B.C. Office: Marine geology and geophysics, earthquakes, crustal deformation, multi-channel seismics, swath mapping and side-scan imagery, paleomagnetism, coastal geology, geology of estuaries, offshore surficial geology, tectonics. Vancouver B.C. Office: Geology and metallogeny of the Canadian Cordillera: structure, stratigraphy, sedimentology, paleontology, petrology, volcanology, hydrogeology, environmental geochemistry, tectonics.

Contact

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Director
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Geological Survey of Canada (Pacific)
P.O. Box 6000
9860 West Saanich Road
Sidney, British Columbia
V8L 4B2

GSC Ottawa

Fields of Research

The Continental Geoscience Division (CGD) comprises a team of specialists delivering integrated bedrock geoscience programs:

- geological and geophysical mapping (with a focus on the geology, architecture and tectonic history of the Canadian Shield and Appalachians);
- geoscience research through interdisciplinary, interagency programs (such as NatMap, Lithoprobe, Targeted Geoscience Initiative);
- process-oriented studies on the continental lithosphere; geochronology and geochemistry (GSC's centre of excellence in precise radiogenic age-dating and isotopic studies);
- geophysical studies of the continental lithosphere (seismic reflection and refraction, teleseismics, magnetics and gravity, electromagnetics);
- high-resolution seismic and EM studies designed to develop and test seismic and EM exploration technology for crystalline crust;
- acquisition of aeromagnetic data for the Canadian landmass and offshore;
- digital geoscience data integration, compilation, visualization, analysis and synthesis;
- geoscience information for the national knowledge base, involving development of GIS

methodologies, standards and research strategies;
- geophysical software and hardware development.

Contact

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Continental Geoscience Division
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Fields of Research

Mineral deposits, mineral resource assessment, mineralogy, analytical chemistry, stable isotope geochemistry, petrophysics, geochemical and geophysical exploration, geomathematics, environmental geochemistry (metals in the environment).

Contact

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Fields of Research

Quaternary geology and paleoenvironments, climate change, permafrost, engineering geology, geomorphology, geological hazards, glaciology, hydrogeology, terrain geophysics, Quaternary geochronology, drift prospecting methods, metals in the environment, natural gas hydrates.

Contact

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Terrain Sciences Division
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Fields of Research

Earthquakes, seismic hazards, test-ban seismology.

Contact

Dr. John Adams
National Seismic Hazards Program
(Eastern Canada)
Tel.: (613) 995-5519
Fax: (613) 992-8836

Field of Research

Geomagnetism.

Contact

Dr. Richard Coles
Geomagnetic Laboratory
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Geological Survey of Canada (Ottawa)
601 Booth Street
Ottawa, Ontario
K1A 0E8

GSC Quebec

Fields of Research

Geology and metallogeny of eastern Canada, particularly the Grenville and (Canadian) Appalachian provinces (including structural geology, stratigraphy, sedimentology, study of precious, high-technology and base metal deposits, and economic geology); Quaternary sedimentology and stratigraphy; Quaternary mapping, eastern Canada; and environmental research (including geological hazards, geomorphology, geochemistry, climate change, permafrost).

Contact

Dr. A. Achab
Director
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880, chemin Sainte-Foy
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Sainte-Foy, Quebec
G1V 4C7

Geomatics Canada

Geodetic Survey Division

Fields of Research

Canadian Spatial Reference System (CSRS); geodetic reference frames and network analyses (3D); Canadian Active Control System (CACS) based on a network of continuously operating GPS stations including real-time WADGPS; geodetic surveying using space techniques and associated computations; GPS heighting; geodetic applications of Very Long Baseline Interferometry (VLBI) using transportable instrumentation; geodetic and gravity data management and information systems; national gravity and geodetic standards; gravimetry including absolute gravity and airborne gravity; geoid determination; integrated geodesy and geodynamics.

Contact

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Geodetic Survey Division
615 Booth Street
Ottawa, Ontario
K1A 0E9

Mapping Services Branch

Fields of Research

Presently, our laboratories are conducting research in the following areas:

- Automated change detection, feature extraction and feature classification from multi-sensor multi-resolution-air and spaceborne imagery, with emphasis on rapid revision of topographic data.
- Validation of spaceborne InSAR generated Digital Elevation Models.
- Digital frame camera systems for rapid mapping applications.
- Object-oriented geo-spatial databases.
- Integration and interoperability of heterogeneous databases.
- Cartographic visualization within the Internet environment.
- Cartographic design and visualization.

- Tactile maps and special needs mapping.
- Interactive animation of 3-dimensional data on the Internet.
- Applications of geo-spatial data for sustainable development of natural resources.
- Gender and cartography.

Other potential fields of interest include:

- Generalization and scale variable representations.
- Geo-spatial data infrastructures.
- Knowledge-based systems.
- 4D virtual spatial tele-presence and for environmental monitoring.

Contact

Dr. Eva M. Siekierska
Research Project Manager
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Mapping Services Branch
615 Booth Street
Ottawa, Ontario
K1A 0E9

Canada Centre for Remote Sensing

Fields of Research

Satellite- and aircraft-based remote sensing applications including research in agricultural inventories, geological mapping, mineral and petroleum exploration, monitoring of forest dynamics, wildlife habitat mapping, land cover and environmental change assessment, oceanography, hydrology and limnology, and civil engineering. Research in climate change and climate change impact using satellite data, specifically earth radiation budget, remote sensing of clouds, aerosols, terrestrial carbon budget, and land cover and cover change. Monitoring fire hot spot and mapping burned area.

Algorithms, procedures, and methods for processing, correction, and analysis of data acquired by satellite and airborne sensors; radiometric and geometric correction; reflectance spectroscopy and radiometry; atmospheric correction of optical data sets; generalization and context transformation of spatial databases and imagery; concepts for management of the analysis of large data sets acquired in earth observation projects.

Specific emphasis on the analysis and interpretation methodologies for Synthetic Aperture Radar imagery and imaging spectrometer data in the context of land and oceans applications of Earth observation data.

Current approaches include the use of image analysis systems; techniques for integrating satellite imagery with vector-based geographic information systems; map generalization procedures, expert systems; models for transmission of light through the atmosphere, bidirectional reflectance, and microwave scattering.

Contact

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Training, Technology Transfer
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Canada Centre for Remote Sensing
588 Booth Street, 3rd Floor
Ottawa, Ontario
K1A 0Y7

Canadian Forest Service

Fields of Research

The Canadian Forest Service's Science and Technology program promotes sustainable forest management and a competitive Canadian forest sector through the development and implementation of knowledge, databases, and technology. The program tackles the more strategic or fundamental national and international issues that the forest community faces. Activities to accomplish these goals are undertaken through a system of five national science and technology research networks administered by five research centres and headquarters.

Each of the following centres serves as the administrative and operational lead for its respective networks. However, it is important to note that activities undertaken with each network have operating components in each of the national centres in addition to the lead centre with which a given network is identified.

For further information, please visit our Web site at nrcan.gc.ca/cfs/proj/sci-tech.

Atlantic Forestry Centre

Fields of Research

Biodiversity and forest health: Providing the scientific foundation for the development of forest biodiversity policies; developing measurement methods and benchmarks; assessing impacts of forest biodiversity; providing recommendations and advice on conservation strategies; acting as the national focus for interpretation and reporting of changes in the health of Canada's forests; air pollution effects research; methods development; and monitoring and analysis.

Contact

Mr. Gerrit Van Raalte
Tel.: (506) 452-3525

Atlantic Forestry Centre
Hugh John Flemming Forestry Centre
P.O. Box 4000
Fredericton, New Brunswick
E3B 5P7

Laurentian Forestry Centre

Fields of Research

Enhanced timber production and protection: To generate knowledge and technology based on life processes that apply to improvement of the quality, productivity, and health of trees and their utilization within ecologically and genetically sound principles; advanced genetics; genetic engineering; conifer somatic embryogenesis; deployment strategies for genetically improved trees.

Contact

Mr. Normand Lafrenière
Tel.: (418) 648-5849

Laurentian Forestry Centre
1055 rue du P.E.P.S.
C. P. 3800
Sainte-Foy, Quebec
G1V 4C7

Great Lakes Forestry Centre

Fields of Research

Forest ecosystem processes: To conduct research to determine how fundamental ecological processes affect the productivity and resilience of forest ecosystems; sustainable productivity research; forest succession research; population dynamics research. To advance the development of ecologically acceptable methods for managing forest pests and to contribute to integrated pest management and sustainable forest development in partnership with other Canadian Forest Service networks, external

clients, and collaborators; biological control; microbial control agents; pest management biotechnology; natural products and semiochemicals; environmental research and assessment; pest management applications.

Contact

Mr. Geoff Munro
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Great Lakes Forestry Centre
1219 Queen Street East
P.O. Box 490
Sault Ste. Marie, Ontario
P6A 5M7

Northern Forestry Centre

Fields of Research

Climate change and fire research: To act as the national focus on climate change, providing leading-edge Canadian expertise related to the impacts of climate change on forests and forest ecosystems, and mitigation and adaptation options available to address the climate change issue at both national and international levels; determination and assessment of the sensitivity of Canadian forests to climate change; determination and assessment of the contribution of Canadian forests and their management to the carbon cycle; to contribute to an improved understanding of global change issues by communicating climate change research results. To increase our understanding and ability to manage wildland fire within the context of sustainable development of Canada's forests; fire environment; fire ecology; fire management systems.

Contact

Mr. Boyd Case
Tel.: (403) 435-7359

Northern Forestry Centre
5320 – 122 Street
Edmonton, Alberta
T6H 3S5

Pacific Forestry Centre

Fields of Research

Knowledge and information synthesis: To develop the scientific understanding and decision support tools to assist in decision making in the sustainable management of Canada's forests; patterns and processes of Canada's forests; sustainable forest landscape management; advanced forest information technologies; forest resource inventory; remote sensing. To assess and develop forestry practices for use in the sustainable development of Canada's forests; effects of clear-cut forestry practices on wood supply; environmental impacts of clear-cut forestry practices; effects of retention (partial-cut) forestry practices on wood supply; environmental impacts of the effects of retention forestry practices; mid-rotation interventions; plantation forestry.

Contact

Dr. Paul Addison
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506 West Burnside Road
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